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MONTHLY JOURNAL

OF

DENTAL SCIENCE, ART, AND LITERATURE,

DEVOTED TO THE INTERESTS OF THE PROFESSION.

EDITED BY

W. H. DOLAMORE, L.R.C.P., M.R.C.S., L.D.S.

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THE DENTAL RECORD.

VOL. XIV.

JANUARY 1st, 1894.

No. 1.

Original Communications.

THE MECHANISM OF ARTIFICIAL PALATES.*

By Mr. J. R. FREEMAN, L.D.S., Eng.

MR. PRESIDENT AND GENTLEMEN,

IN bringing this subject before your notice to-night, it is with the hope that it may be of some service to those, who are not sufficiently well acquainted with this part of our mechanical training; for I feel sure that a great many of us have passed through our apprenticeship, and may even pass through our hospital career, without ever having made or even seen an obturator or artificial velum constructed. I do not wish to infer, from this statement, that it has been due to any lack on our part in seeking and obtaining the knowledge from which we are to profit, not only ourselves, but more especially our patients, but more from lack of material, as the cases requiring such appliances are not of every-day occurrence, and in private practice often amount to nil.

It is not my intention to-night to touch upon any of the causes or the various methods of treatment, other than mechanical, that may be performed on the many malformations met with in the mouth, as this was most adequately treated in the paper last read before this Society by Mr. Austin.

Artificial palates are appliances used for the relief of malformations of either the soft or hard palates, or of both combined, whether congenital or acquired; they may be divided into two chief classes:

(a.) Obturators.

(b.) Artificial vela.

Starting with our first class: An Obturator may be defined as a plug or cover consisting of a hard and non-elastic body; fitting an opening in the soft, or covering one in the hard palate; such openings having a well-defined border. Of the obturators in use there are three kinds: first, those which are used to cover an opening in the hard palate; secondly, those applied to openings in the soft palate, both of these being used in the treatment of acquired lesions; whilst the third class are employed in congenital clefts, and are usually known as the Suersen Obturators.

* A Paper read before the Students' Society of the Dental Hospital of London.

In the construction of an obturator, to close a perforation or opening in the hard palate, little need be said, as the process is one similar to that used in making a base for artificial teeth. The first thing necessary is a correct impression from which we can obtain an accurate model to work upon, and I think this is a point on which too great a stress cannot be laid, for I am sure that much labour and valuable time is often lost in working to a bad one.

For taking the impression, plaster of Paris is best, being more reliable than any of the other materials, which we are accustomed to use; it should be prevented from entering the cavity of the nose by placing a piece of moist paper over the opening. Having obtained the impression, pour it in the usual manner. A plate should then be made of vulcanite or metal, which shall completely cover, but not enter, the opening, such appliance being kept in position by impinging upon the adjacent teeth or it may be fixed by carefully adjusted bands. Should any spaces exist in the dental arch, teeth may be added to the plate. In passing to our second class of obturators or those used for simple perforations of the soft palate, a little more care must be exercised.

The impression in this case differs from the former, inasmuch as it should show with distinction the outline of the perforation; to obtain it, plaster should be used, but care must be taken that a surplus is not forced through the opening, or great difficulty will be occasioned in its withdrawal. Dr. Kingsley recommends first taking an impression in wax, as if this is forced through it may be easily removed without injury to the patient, from this wax impression make a plaster model, and upon this mould some sheet gutta-percha, using a stick, piece of wire, etc., for a handle, the gutta-percha should not enter the opening nor impinge upon its borders; then with a uniform layer of plaster of from $\frac{1}{16}$ to $\frac{1}{8}$ of an inch in thickness, an impression may be obtained without any surplus to give anxiety. The model being obtained, the appliance is made in two pieces, one portion covering the hard palate and united to the portion fitting the perforation in the soft palate by means of an hinge, which should be made of gold, and placed at the junction of the soft and hard palates, this allows the appliance to adapt itself to the constant movements of the soft palate.

The main portion of the plate, *viz.* that covering the palate, is made in the usual manner and fixed by means of clasps to the teeth, or, if the mouth is edentulous, it may be kept in position by means of suction. The part fitting the opening in the soft palate is first moulded in gutta-percha, and should possess a flange at its posterior superior border to rest upon the superior or nasal surface of the soft palate when it is placed into position, otherwise the mobility of the joint would allow it to drop out of the opening, from this portion is carried a band of gold, which is made to lie against the lingual surface of the velum palati, and is continued forwards to the hinge or joint previously spoken of to which it is attached. After trying it in the mouth, to see that it adapts itself to the movements of the velum palati when it is raised and lowered by the action of its muscles, it may be flaked and packed by the ordinary methods. Upon introducing the appliance into the mouth, the obturator part

should be placed into position first, carrying the clasps to the teeth subsequently.

We now come to our third class of obturators, *viz.*: the Suersen, so named from Dr. Wilhelm Suersen, who first introduced it in the year 1867, and was described by him before the Central Association of German Dentists, at Hamburg.

In taking the impression for an obturator of this class no notice need be taken of the cleft, a model of the hard palate being all that is necessary. To the model obtained a trial plate is made by striking up a Britannia metal plate, which should be of the same thickness as an ordinary contour vulcanite case, but if it is considered desirable to have gold covering the hard palate, this may be temporised for the same purpose; to its posterior margin is soldered a piece of plate or wire which should be bent in the direction of the cleft. A good plan is to have this wire about the thickness of an excavator handle, and to flatten its anterior half from above downwards whilst its posterior half is flattened from side to side. Around this wire is placed sufficient Stent's composition to more than fill the cleft, preference being given to this over wax and gutta-percha on account of its being more easily trimmed and modelled to the required shape, while the stent is soft it is placed in position and the patient directed to swallow several times in succession, care must be taken to see that no air escapes between it and the flaps, also that it extends back sufficiently to allow the superior constrictor of the pharynx to touch its posterior surface in the act of deglutition, so as to cut off the cavity of the nose from that of the pharynx it should also be sufficiently deep to allow for the rise and the fall of flaps; the piece is then taken from the mouth and placed in cold water until thoroughly hard, when any excess may be trimmed off with a sharp knife.

Having satisfied ourselves that all is correct, flack in the usual manner, leaving only the lingual surface of the obturator exposed in the lower half of the flack. The packing of the case differs from the ordinary method, inasmuch as the part filling the cleft has to be made hollow. To do this, the plaster in the two halves of the flack must be thoroughly dried, first pack the part covering the hard palate and screw up in press, any excess of rubber will then be squeezed into the space left to form the obturator; cut this off with a warm knife and paint the surfaces, which form the boundaries of the obturator, over with a solution of rubber in chloroform, evaporate the chloroform; then take a piece of rubber and place it in the bottom of the cleft, another piece is then placed around the sides, taking care to press it against the plaster, when the rubber solution will hold it firmly in position, a thin strip of rubber is then placed over any joints and pressed well into position, it is then painted over with rubber solution to ensure all the joint surfaces being made secure. A piece of rubber the exact size is then placed on the upper half of the flack so as to form, when the flack is closed, the lingual surface of the obturator, before closing the flack, place a few minims of water into the hollow of the obturator, the water becomes converted into steam during the process of vulcanizing and so maintains the rubber in apposition with the plaster.

The advantages and disadvantages of this form of obturator I propose leaving until I have described the artificial velum of Dr. Kingsley, which constitutes our second class of artificial palates.

As the success of an artificial velum depends very much upon the accuracy of the model obtained, I trust you will be patient with me through a lengthy account of taking the impression. It is essential that the entire border of the cleft, from apex to uvula, should be represented on the model, together with the superjacent nasal cavity; the best form of impression tray is one similar to that described in treating perforations of the soft palate. only the posterior edge should pass back beyond the divided uvula and its edge should be turned upwards, the object of this being to prevent any surplus plaster from entering the pharynx when the impression is taken. With a thin film of plaster placed in a tray, an impression is first taken of the lingual surface of the palate, which impression should show definitely the entire border of the cleft, on removing it from the mouth any plaster which may have been forced into the cleft should be pared off; the surface is then painted over with a solution of soap to prevent the nasal portion from adhering when brought in contact with it. The next step will be to obtain, in conjunction with this impression of the lingual surface, which may be termed the palatal impression, a further impression of the upper or nasal surface this may be done by filling the cavity above the roof of the mouth with soft plaster down to the level of the cleft, and, while soft, replacing the palatal impression against this, keeping it in position until the plaster has set. On withdrawing the palatal impression from the mouth the nasal portion will be left *in situ*, but can be removed with a pair of conveying forceps by carrying the mass first backwards and downwards, then forwards and outwards. Another method of obtaining this nasal impression is to drill a hole through the tray and palatal impression in the median line of the cleft, then pass a rubber tube through this hole, one end of the tube extending through on to the nasal surface, the other being carried forward and held with the palatal impression in position by an assistant; in the outer end of the tube is placed the nozzle of a syringe, the piston having been previously withdrawn, plaster mixed very thin is poured into the syringe, the piston replaced, when slight pressure on the handle will force the plaster through the rubber tube on to the nasal surface of the soft palate and adjacent parts of palatal impression. The patient should be previously instructed to incline the head forwards or backwards according as the plaster is felt to be running down the throat or too far in the opposite direction. The syringe should be removed before the plaster sets, and thoroughly cleansed for future use.

The method of obtaining the model from such an impression does not require any particular description, as the process is similar to the making of any ordinary cast, but should it not indicate the superior surface of the soft palate, this may be done on the cast by carving; the use of a small mirror and a blunt probe will greatly assist in obtaining the thickness of the velum and the depth behind the fissure. It is not essential to the success of the appliance

to be made that the posterior or nasal surface of the soft palate be represented with the same accuracy that is required of the inferior surface.

The next step in the operation is the formation of the artificial palate, which is first moulded upon the plaster cast in gutta-percha and extended in an oblique direction until it approaches the posterior wall of the pharynx. No attempt should be made to represent the uvula.

It is necessary to try it in the mouth by attaching it with a pin of gold wire to the plate, covering the hard palate, to see that it acts perfectly when the levator muscles are acting, together with those of the pharynx, the former lift the artificial palate and, in a sense, carries it back, whilst the latter in contracting bring forward the pharyngeal wall.

Having attended to these points its duplication in hard rubber is then recommended as it will enable the operator to make a more artistic model and one which can be handled with greater freedom.

From this model a mould has to be constructed in which to vulcanise the velum, this should consist of type metal (Pb. 4 pts. Sb. 1 pt.), and is best made in four pieces, which on being placed in their respective positions, will produce a velum in one continuous piece. The method of obtaining this type metal mould is to take a plaster cast of the superior, inferior, and two lateral surfaces of the model made in hard rubber, each piece of plaster having exactly the form desired in the type metal, these are reproduced in type metal by the method generally adopted in making an ordinary zinc die. The model is then placed in position on the type metal and the hole through which the gold pin passes is marked off, drill the metal in this position and insert a piece of iron wire.

The surface of the mould is then washed with a thick solution of soap to enable the palate to be more easily removed after vulcanising, then pack in the rubber and fasten the several parts of the mould together by a clamp specially designed for this purpose and vulcanise for two hours at each of the following temperatures 240°F, 260°F and 270°.

After vulcanizing the gold pin, attached to the plate covering the hard palate, is passed through the hole made in the velum by the iron wire and rivetted on its nasal surface.

The mould, in which the artificial velum is made, should be kept for future use as in the course of a life time a considerable number of these elastic palates will be required.

After inserting the artificial velum of Dr. Kingsley or the less elaborate form of Suerson, it is necessary to impress upon the patient's mind the necessity of reading aloud for one or two hours daily, or, if possible, the patient should undergo a course of training under the care of one who understands the mechanism of speech, this is rarely necessary with the obturators used for acquired lesions.

In discussing the advantages and disadvantages of these two forms of obturators, Dr. Kingsley says, "That, of all obturators to supply deficiencies of the soft palate and induce correct articulation, the one introduced by Suerson contains the truest principle and

is best adapted to the purpose," he also states "that correct articulation is more easily acquired with an elastic velum, than with a Suerson's obturator." His plan of operating is first to insert an artificial velum until distinct articulation has been acquired and then to change it for one of Suerson's.

Amongst the other advantages claimed for Suerson's obturator may be mentioned that it is more durable, is less likely to get out of order and being less complicated is more easily and quickly constructed, whilst another great advantage claimed is that a model of the cleft is not necessary.

The disadvantages of Kingsley's vela are, that they require renewing about every six months, although in some few cases they have been known to last for years, the durability depending much upon the cleanliness and care taken by the wearer.

The great trouble often necessary in obtaining the impression is a decided drawback to its use, together with the many stages that have to be gone through during its manufacture. In conclusion, gentlemen, I must thank you for the kind way you have listened to the paper and trust it will lead to a good discussion.

NEURALGIA AND ITS TREATMENT.

By WILLIAM E. JAMESON, L.D.S., Eng.

NEURALGIA or nerve pain is a term applied to certain painful affections following the course of different nerves, but in most cases dependent on some insert constitutional condition.

The following conditions may be enumerated :—

(1) Whatever tends to general malnutrition, as for prominent abnormal example, teeth incapable of performing their proper function of preparing food for the digestive process.

(2) Degenerative changes in any part of the body.

(3) Exposure to cold, wet, or malaria.

(4) Any excess of mental or physical exertion.

(5) The presence of metallic poisons in the system, particularly those of mercury, lead, or copper.

(6) Heredity.

Local causes are more numerous :—Irritation of a nerve such as that produced by the exposure of the pulp of one or more decayed teeth, or the presence of exostosis on their roots. Pressure from any cause, such as an enlarged gland or an impacted bullet for broad examples, injury to a nerve by cutting or wounding it, and the like.

An authority remarks, "It is universally the case that the existing condition of the patient at the time of the first onset of the disease is one of debility, general or special."

The pain of neuralgia is at first all but universally unilateral and intermittent, but afterwards occurring at regular periods ; the pain is sometimes excruciating in character for a time, coming on suddenly and ceasing as abruptly, leaving the patient in temporary absolute comfort.

The principal varieties of neuralgia are :—

- (1) Those affecting the dental nerves.
- (2) Tic-douloureux.
- (3) Those affecting the inter-costal nerves.
- (4) Sciatica.
- (5) Lumbago.

Treatment in the first mentioned case is usually operative and constitutional. The removal of any teeth or fangs that may act as causes of irritation, attention to diet and hygiene, regulating the state of the alimentary canal, and care in avoiding exposure to cold and damp. After the removal of the teeth in these cases, the administration of two grains of sulphate of quinine taken after the principal meal of the day, and continued for a month, is generally efficacious in preventing a renewal of the attack.

In tic-douloureux the removal of teeth that would otherwise be properly retained is to be deprecated ; one after another may be extracted without any improvement resulting. Medical treatment directed to the general state of the system must be resorted to, and is alone available. The same may be said with regard to sciatica, lumbago and inter-costal neuralgia. In a form of neuralgia affecting the scalp a few drops of Fleming's tincture of aconite rubbed into the affected part, is generally efficacious.

In all cases of anything approaching a severe neuralgic attack, constitutional treatment must be steadily persevered with. Fatty foods, such as Devonshire cream partaken of, cod liver oil where it can be borne on the stomach, quinine in full doses in malarial cases, iron in anæmic ones. Arsenic, strychnia, phosphorus, cocaine, and the various anodynes, with menthol as a domestic remedy, are all useful. Valerianate of zinc is indicated where nervous debility exists. Two other remedies may be mentioned, antipyrine, given with advantage in many cases of tic-douloureux, and tincture of gelsemium, especially valuable in dental practice.

In superficial cases pressure on the spot affected frequently gives relief, as may oil of cloves or eucalyptus, chloroform or belladonna linament, or ointment of aconitine, or the like rubbed into the affected part.

In some cases, fortunately few in number, the subcutaneous injection of sulphate of morphia with atropine becomes necessary, or the affected nerve may have to be stretched or divided before even temporary relief can be obtained, and the use of electricity must then be called upon in the hope of cure.

YET ANOTHER PROFESSIONAL HOLIDAY.

The World's Columbian Dental Congress.

BY GEORGE CUNNINGHAM.

(Continued from page 538.)

THE length of the opening session, and the necessary replenishment of the inner man, rather interfered with the opening of the various sections in the afternoon' at the appointed, or even at a later, hour; but several of them were organised though no papers were read. On the second day, clinics, general session and section meetings all fitted in, and kept everyone very busy; and so it went on all through the week, the attendance and interest being well sustained till the Saturday, except that on Wednesday and Thursday two supplemental general sessions were held in the evening, and were devoted to lantern exhibits.

It would be hopeless to attempt even the briefest *resumé* of the work done, as may be proved by the fact that the report in the September number of the *Dental Cosmos* runs into just 400 pages.

The Hall of Washington, in which all the General Sessions were held was situated so close to a busy railroad that the too frequent passing trains with their brazen bells often completely drowned the words of even the strongest speakers. To this fact, and to the poor acoustic properties of the hall (rather than to the character of the Communications), must be ascribed the small amount of discussion at these meetings. Dr. Zsigmondy's paper on "Congenital Defects of the Enamel," and that of Professor Miller "Concerning Various Methods Advocated for Obviating the Necessity of Extracting Devitalized Tooth-pulps," were both the results of long and patient research, and alike worthy of their authors and the audience to whom they were addressed. Dr. Whitney, from Honolulu, Sandwich Islands, gave a most interesting account of the condition of the teeth and skull of the ancient Hawaiians, and the specimens he

exhibited were of extraordinary scientific interest, proving that a very large percentage of caries, the presence of dental irregularities and the non-eruption of the third molar are not solely characteristics of modern civilization.

Dr. Girdwood, L.D.S.,Edin., sent a paper on "English Tube Teeth," which was well illustrated by diagrams and specimens. It seemed to me a most complete and extensive paper, embodying excellent suggestions for the use of these teeth in many directions not usual even in England. It was a novel subject to an American audience, and excited much interest, although it suffered like others from the absence of the author.

I must confess that I can say little about Professor Fillebrown's paper on "Hypnotic Suggestions as a Dental Obtudent and Sedative" for alas ! it was only too effective, and not even my most persistent efforts prevented my constantly relapsing into an uncomfortable intermittent sleep. His cases are interesting, and I gathered that in five years time the practice of every intelligent dentist would be governed by the principles of hypnotic suggestions; *nous verrons.* I have given some attention to this subject, and I think not. I wanted to have asked the essayist if he charged by 'time' for the time-element in such cases, except in very rare instances, is very considerable.

Despite other attractions, the evening sessions were very well attended and well they might be, for the lantern exhibits were of the highest order. Dr. Andrews was especially successful in his profusely illustrated "Contribution to the Study of the Development of the Enamel." A thrill of approval ran through me as I heard him allude to Mr. Mummery's Royal Society paper on the "Structure and Development of Dentine" as "perhaps the most important contribution to the literature of dental histology during the last decade." Dr. Andrews has long made enamel his special study just as Mr. Mummery has dentine, his skill as a photo-micrographer rivals that of his English co-worker, hence his conclusion that there probably exists in developing enamel a fibrous sub-structure on and between which the enamel is deposited, though its existence seems wholly blotted out in the dense calcification of the tissue, is all the more interesting, and justifying his being described as the Mummery of America.

Dr. Sudduth's paper on "Some of the Forces that Influence the Form of the Jaws and Teeth during the Process of Development "

was more educational than original, and seemed scarcely up to his own standard.

The second lantern session was an English night.

Dr. Andrews read Mr. D. E. Caush's paper on "Some Changes that take place In and Around the Pulp Canal." His views met with some criticism, but his beautiful slides evoked the heartiest appreciation of all, but especially that of the veteran researcher Dr. G. V. Black.

My own paper followed on "Luxation, or the Immediate Method in the Treatment of Irregular Teeth." The illustrations showed the external and internal aspects of cases in which from one to six teeth had been moved and ranging over a period of some six years. I learnt from the *Dental Review*, of the next day, that my treatment and the record of my experiments were exceedingly remarkable in the success obtained, and that I was asked and satisfactorily answered many questions by my interested audience.

On the following morning, Dr. Bryan, of Basle, Switzerland, who quite independently of me had successfully experimented in this direction, gave a clinic on "Immediate Regulating," employing, I believe for the first time, my method of cutting through the alveolar plate with a circular saw. As the case is a typical one, I quote the following account of the clinic.

"The patient was about fifteen years of age and appeared to be well nourished. The case was a right superior lateral incisor, standing inside the arch and articulating on the lingual side of the lower teeth. After injecting a few drops of four per cent. solution of cocaine on the lingual and labial aspect of the gum, the operator made two incisions in the gum on the labial side, one on either side of the root, extending from the gingivis up to the apex. He next cut through the alveolar plate beneath these incisions by means of a circular saw in the engine. He then adjusted a soft rubber-lined metallic guard on the outside of the arch, and placing one beak of the forceps on this and the other beak on the lingual side of the crown of the tooth, forced the tooth into its new position. It was unnecessary to ligate the tooth, as the articulation was such as to keep it in position. The operator by this method avoids moving the apex to any extent, and forces out with the tooth the labial portion of the alveolus."

No doubt many practitioners are, and will be, timorous about such a radical operation. Both Dr. Bryan and myself are very

confident as to results, especially in such cases, which are constantly recurring and usually pass untreated. This confidence is further shown by the fact that the patient in the clinic referred to, was the niece of the operator. I subsequently heard that the case was making the usual good progress.

I shewed photographs of models in my lecture of a similar case (*a*) mouth irregular at 4 p.m., (*o*) regulated at 4.15 p.m., the patient catching the 4.35 train to London, and dining well at his usual hour. Good enough for America, that !

Space will not permit me to refer to many excellent papers read in the sections, but quite worthy of places in the programme of the General Sessions. Some exception has been taken to some of the papers as being unworthy of so great an occasion. That was inevitable. In the absence of any well defined standard of merit, the task of adjudication would have been a very invidious one. I think perhaps that possibly too much leniency was shown to foreign essayists, but surely that was but an error on the right side. I fear that even the best of communications would profit by judicious editing, but where alas, are we to find that other eye, independent but sympathetic, if it is to be of any real use ?

This sectional arrangement gave rise to considerable criticism, both then and since. With a plethora of material and a limited time of meeting, any other arrangement would have been infeasible. Simply because of "the impossibility of dividing one's personality into eight sections," it is absurd to conclude that "very little of real scientific value" was accomplished. Without even being omnivorous intellectual giants of the Barrett or Truman type, we may feel a certain sense of disappointment that in following up the work of one section, we have been missing matter of much interest in another.

That is one of the disadvantages of development ; our prehensile faculties as it were do not increase with our opportunities of acquiring knowledge, and perhaps happily so. In the choice of a section as in other things, we must learn to exercise a wise discretion. Moreover, many a essayist prefers to read his paper before a smaller audience of those who take a warm interest in the subject rather than in the presence of a larger one where the majority are cold and apathetic. Many contributions are of general ; many, and some of these of the best, are only of special interest. The combination of general with sectional meetings provides the most satisfactory method of doing adequate justice to both.

The contrast between the discussions at the general meetings and those in the sections, were most marked, for the latter were bright, lively, and well sustained, as the former were dull, dead, and infrequent. "Magnetism in numbers!" Yes, indeed, in matters of great political or social interest: but not in science, quality predominates over quantity; mind, over numbers. Far from regretting the "unified" arrangement of the Oral Section of the International Medical Congress at Washington, I regard the general and sectional arrangement of the World's Columbian Dental Congress as a very marked sign of progress, already attained and accepted by other kindred organisations.

I have dwelt at some length on this subject mainly because of the necessity of some such arrangement being adopted at the meetings of the National Associations on both sides of the Atlantic, and from the criticism aroused by the partial adoption of the sectional arrangement at the annual gatherings of the British Dental Association by the formation of a Microscopic Section, proceeding simultaneously with a general meeting. This is not the best possible arrangement but a distinct advance, and should lead in the near future to the formation of other sections. At present, a "sectional" paper comes on perhaps early in the programme, out go a number of those lacking interest in it, probably never to return, or returning too late to hear the other paper or papers in which they were interested and which they might have discussed. Even in our limited speciality there are so many matters of interest that it is impossible to have an equal enthusiasm for all. Why not then cater for the greatest number by "sectionising" and thus providing for the varied predilections of each?

"Now tell me about the clinics. Haven't you brought home some improved arrangements which we can adopt at the coming British Dental Association meeting?" was the characteristic enquiry of our alertful secretary. A shade of sadness on my face, and a deliberate "No" was my only reply. "Totally inadequate" may be a just verdict, but it would be unfair to state it so without some recommendation to mercy on account of extenuating circumstances. It must be granted that to make clinics satisfactory, under even ordinary circumstances, is extremely difficult, and under those of this Congress well nigh impossible. They would have been much, very much better, if the magnificent new building of the Chicago College of Dental Surgery had been ready for occupation. As it was, the

largest available venue, the old College was being given up, having served its time ; arrangements for removal were already in progress ; and therefore it is not surprising that things were not what they might have been. But to conclude that they "were practically rendered valueless by the conditions and environments," is to return not merely a harsh, but an unjust verdict.

In order to carry out my own clinic, I was obliged to pass a very considerable part of several successive days getting the apparatus and appliances through the Custom-house. Therefore, to my regret and disgust, I had to lose much in the way of both clinics and meetings. I had, however, ample opportunities of gathering the opinions of my compatriots who all acknowledged having derived considerable benefit from the interesting series of clinics, and specially mentioned the veteran Bonwill as a tower of strength in himself. Of course, they complained of the crowding ; but how can some hundreds of persons see the details of an operation on so small an object as a tooth ? Such an operation can only be seen by a very few. We must devise some plan of enlarged models or of having natural teeth prepared previously, showing the operation in its various stages ; we must demonstrate principles, rather than illustrate details, if we are to be more successful with our clinics. In some operations *detail* is everything ; why not recognise the inevitable and limit the attendance to such by *ticket* ? From a demonstrator's point of view, I prefer to have a room to myself, so that even if only a relative few are present they can at least get some general idea of the whole demonstration. In one large room, men flit like butterflies from clinic to clinic, usually sipping but an aggravating thirst-exciting drop of knowledge from each, and often in the process hindering the demonstration to those who have followed it throughout, by inopportune questions.

I did get such a room to myself, and think I must have satisfied some who attended for I had to repeat the demonstration several times after the Congress. I mention this not because of the processes demonstrated, a low fusing continuous gum and tooth-tinting, but because the appliances and specimens were illustrations of the results obtained by pupils trained under the system advocated in the proposed Institute of Dental Technology. This scheme excited much interest and very considerable approval among many of the most enthusiastic dental education reformers.

Just a line here which may do good in future. I found, in the official programme, the full title of my clinic, fully displayed, but

credited to someone else. Judging from remarks called forth by similar accidents, I should have gone to the Secretary-General or someone in authority, protested against this wanton insult, and withdrawn from the Congress: *verb. sap.*

REPORT OF SOCIETIES.

THE ODONTOLOGICAL SOCIETY OF GREAT BRITAIN.

THE usual Monthly Meeting was held on the 4th ult. at 40, Leicester Square, when the President (Mr. BOWMAN MACLEOD) occupied the Chair. There was a large attendance.

Mr. G. Hern and Mr. C. Woodhouse were appointed auditors.

The PRESIDENT made sympathetic allusion to the loss the Society had sustained by the death of two very old members, Mr. W. R. Wood, of Brighton, and Mr. J. E. Rose, of Liverpool. Both gentlemen had—he said—been members of the Council, and it was a very peculiar coincidence that each membership dated from 1863. He requested the Secretary to forward the relatives letters expressive of the feelings of those present.

Mr. E. Blair, of Taunton, and Mr. C. S. Sutcliffe, of South Shields, having formerly declared their adherence to the conditions of membership were announced to have been elected.

Mr. STORER BENNETT (the CURATOR) reported that he had received two series of specimens for the museum from Mr. Morton Smale. The first one was an extremely good example of the mechanical work done thirty years ago. It was a denture of carved ivory with natural teeth let into it. Such work was now quite obsolete. The other specimens were the fossil teeth of some curious race of hyppopotami, the name of which was not at present known. Similar teeth had been sent to the British Museum, and the authorities there were working to ascertain the name of the animal to whom the teeth at one time belonged. Then there were two models which he (Mr. Bennett) begged the Society to accept. One a model taken from the mouth of a boy aged six, shewing a peg-shaped supernumerary tooth between the upper central incisors, whilst the second was from a boy aged five, showing two geminated central and lateral incisors in the lower jaw. This model was presented by one of their past students, Mr. Trewby.

Mr. W. HERN made a casual communication in respect of a case of circumscribed necrosis of the mandible on the left side, involving the mental foramen. The youth was nineteen, and when he came to the hospital was first seen by Mr. Robbins. When he (Mr. Hern) saw him, the man had just the ordinary symptoms of necrosis. The history the patient gave was that he had had a blow from a stick, but judging from the state of the mouth it did not appear to have any relation to the necrosis. The teeth were all normal with the exception of the second bicuspid which the patient believed was extracted. The necrosis, Mr. Hern thought, was due to suppurative periostitis. The case was interesting on account of the close contiguity of the bicuspid root to the mental foramen.

Mr. ROBBINS said the patient was very drowsy when he saw him, and unable to give particulars. He took him to the extracting room and removed the bicuspid root which was very deep down with the apex backwards and outwards. There was considerable necrosis but the sequestrum was not quite severed, he therefore gave the patient a little Condyl's fluid as a mouth wash.

Mr. HENRY WEISS described an angle mallet which he had devised for attachment to the dental engine. He claimed that it enabled the operator to see his work, that it was so arranged as to enable one to tell by the least thing when it was getting out of order, and to readjust it with a mere touch, and that it permitted the calculation of the blow. Another thing was that the gold could be held at the time it was being malletted, and he obtained a distinct blow. He also exhibited and explained a new chip blower designed by himself. It consisted of an india-rubber bulb, underneath the treadle of the dental engine, and tubing carried along the upright and arm to the chip blower which was attached to the handpiece. At each revolution on the engine wheel a little puff of air might be directed at the point of the handpiece, thus enabling the operator to clear away the *débris* as he progressed, not stopping in his work. It had hitherto been generally thought it was necessary that they should have heated air. He had made several experiments in that direction without getting an appreciable heat, and he decided to do without it. He then discovered that instead of the air giving pain it rather did otherwise.

Mr. ASHLEY BARRETT explained a small devise for measuring the stumps of molars intended to be crowned. He did not claim absolute novelty for it, as he believed something similar had appeared in the American Lists.

Dr. J. W. PICKERING read a paper on "*The Physiology of the Heart in Relation to Anæsthetics.*" The controversy as to the part played by the heart in deaths resulting from inhalation of anæsthetics showed but little sign of abatement. He proposed to treat the subject from an experimental standpoint, and from this standpoint it was unwise to deduce generalisations from a single series of animals, as had been shown by the recent experiments of Prof. Halliburton, who working with a toxic substance termed nucleio-albumin, had found albino rabbits far more resistant to the fatal effects of the drug than darker animals of the same species. He did not doubt that the discordant conclusions of different observers were due to two causes, first, the limitation of their experiments to the single group of animals without paying sufficient attention to the experiments of others, secondly, the failure to appreciate the important part played by "individual idiosyncrasy." The following were some of the possible modes of action of anæsthetics on the heart. (1) The anæsthetic acts on the cardiac muscle itself, and may directly paralyse its contractile power. (2) That the paralysis of the heart, when present, is due to the action of the anæsthetic of the intrinsic cardiac nervous mechanism. (3) That chloroform syncope is due to a reflex cardiac inhibition cause by irritation of the nerve endings of the vagi in the lungs. (4) That chloroform primarily paralyses

the respiratory centre in the medulla oblongata, and that the consequent asphyxial condition of the blood secondarily paralyses the heart. (5) That cardiac dilation, when present, is due to pulmonary obstruction, and that chloroform has no specific action on the heart. This last view, advocated by Lawrie, had been rendered improbable by the experiments of McWilliam and others, who had shown that chloroform would produce dilation of both sides of the heart.

Feeling that the presence of the nervous system was an obstacle to accurate deduction, he had attempted to eliminate this difficulty by experimenting on the hearts of embryos previous to the development of a functional nervous mechanism. The chick embryo between the fiftieth and eightieth hour of incubation presented an accessible form of heart minus a nervous system. Although at this period of development the embryonic circulation was very active there could be no complication due to a change of blood-pressure. Also the factor of asphyxia was eliminated, except when purposely introduced, by placing the embryo in an atmosphere of carbonic acid. Anticipating the question "what evidence is there that the heart at so early a stage is influenced by drugs in like manner to the adult heart?" he had made a large number of experiments showing that the typical action of drugs admitted to directly affect the adult heart is so well exhibited in the embryonic heart that it was possible to recognise their dilute solutions by their physiological action alone. It was therefore in evidence that the embryonic heart afforded a convenient means of determining whether a given drug acts directly on the heart or through the agency of a nervous mechanism; they could easily experiment with chloroform, ether, or nitrous oxide, either pure or mixed with air, oxygen, or carbonic di-oxide. They could also test the action of drugs on hearts that had been stopped by anaesthetics, and thus get some indication of that great desideratum—a drug which would antagonise the toxic action of anaesthetics on the heart. All his experiments had been made on hearts *in situ*, and under conditions such that their rhythms were maintained for many hours unchanged, provided that no stimuli either chemical or physical were applied to them. With chloroform and ether he had obtained widely divergent results, for example, one half of cc. of a chloroform solution containing .00003 cc. of pure chloroform will, if injected under the blastoderm of the embryo, rapidly reduce its cardiac rhythm and produce an exaggerated diastole. After the injection of .0004 cc. the heart stopped in an extremely dilated condition, but the auricle gave a few twitches in response to mechanical stimuli. Ether, on the one hand, acts as a powerful stimulant to the embryonic heart, a heart whose action had been stopped by exposure to cold was restored to its normal rhythm by the injection of .003 cc. of ether dissolved in 1 cc. of normal saline. It was only after comparatively enormous doses that ether could depress the cardiac rhythm of the chick embryo. These experiments showed that chloroform and ether have an essentially different action on the embryonic heart, chloroform having a depressor and ether an augmentor action, a conclusion at variance with the view of

Claude Bernard, reiterated by the Hyderabad Commission. Nitrous oxide and air in a mixture of 70 per cent of N_2O and 30 per cent of O had but little depressant effect on the embryonic heart. Pure nitrous oxide after several minutes action stops the embryonic heart in diastole. A mixture of 70 per cent N_2O and 30 per cent of CO_2 rapidly stops the heart's action after thirty seconds exposure. A mixture of 70 per cent of N_2O and 30 per cent of O stimulates the heart. The heart's action is unimpaired after several hours exposure to this mixture. Hearts that had been stopped by the mixture of N_2O and CO_2 could often be restored by the passage of a current of oxygen over them. A mixture of carbonic acid and chloroform was far more toxic to the embryonic heart than a mixture of chloroform and air. He had failed to restore hearts stopped by chloroform with oxygen. Raising the temperature of the embryo still in an atmosphere of chloroform or nitrous oxide would usually restore the stopped cardiac rhythm. This restoration was more difficult when there was a large percentage of CO_2 present. He was therefore of opinion that CO_2 increases the toxic power of chloroform and nitrous oxide on the heart. The conjoint action of carbonic acid and chloroform during failing respiration, which had been emphasised by Dr. Brunton, was worthy of consideration. It had also gained additional interest owing to the recent researches of Oliver and Garrett on the tension of gases in the blood during anæsthesia. They had found that during chloroform narcosis, there was a tendency for the amount of CO_2 to increase, and the amount of O to diminish. A mixture of Brin's oxygen, which contains 7 per cent. of nitrogen, when given with chloroform, delays the appearance of anæsthesia, and may induce temporary apnoea. The increased oxidation of the tissues causes an excess of CO_2 to be present in the blood, which is, however, scarlet, owing to the large amount of oxyhæmoglobin present. In cases where large doses of the anæsthetic stopped the respiration, the heart continued beating. Thus there was apparently with the administration of oxygen and chloroform less danger of cardiac stoppage than with chloroform alone. With nitrous oxide alone a marked decrease of oxygen was exhibited, but *no excess of carbonic acid*. He understood that Oliver and Garrett apprehended a source of danger in nitrous oxide anæsthesia, owing to the lack of oxygen in the blood. Other investigators have observed that an excess of CO_2 will induce hypernæa more readily than a deficiency of oxygen. Hypernæa begins when the CO_2 exceeds 4 per cent. of the atmosphere breathed. An atmosphere containing 10 per cent. of CO_2 will produce extreme distress, followed by frontal headache and often by vomiting. If the percentage of CO_2 be raised to 18 per cent., the respirations are rapidly stopped. Hypernæa does not set in till the percentage of oxygen has fallen to 12 per cent. of the atmosphere breathed, provided that the carbonic acid be removed. It therefore seemed that the deficiency of oxygen in nitrous oxide anæsthesia was not a source of danger, and it might be a question worthy of discussion whether the conjoint administration of oxygen in nitrous oxide anæsthesia by an increase of the amount of CO_2 in the blood

might depress rather than aid the organism ; whether it was not better to ventilate the lungs with air, which would tend to remove the CO_2 without stimulating the production of an excess of CO_2 . On the other hand it must not be forgotten that oxygen has a stimulant action on the heart.

Passing to the vexed question whether nitrous oxide forms a compound with any of the constituents of the blood, or whether its action is owing to the formation of reduced hæmoglobin and consequent deprivation of the tissues of oxygen, Dr. Dudley Buxton, contrary to the opinion of Dr. McMunn, had urged the former view, and the recent researches of Christian Bohr, together with those of Dr. A. E. Wright (which point to a rôle played by CO_2 in the chemical compounds formed by the blood plasma), lent much probability to Dr. Buxton's conclusions, and emphasised the danger of inferences drawn from negative spectroscopic results. The question must be, however, left *sub judice*. The importance of the existence of a compound of carbonic acid and hæmoglobin was obvious in its relation to anæsthesia, for they had to deal with a new compound in the blood and not with merely dissolved carbonic acid, or carbonic acid combined in the plasma as sodium hydrogen carbonate. This substance might account for an excess of CO_2 being more noxious than a deficiency of oxygen.

As to the possibility of pharmacologically antagonising the depressant action of anæsthetics on the heart, Dr. Ringer found that if a frog's heart had been stopped by chloroform, the application of a one per cent. solution of ammonium hydrate directly to the ventricle would restore the heart's beats almost to its original power. Dr. Pickering had tested this antagonism on the embryonic heart, and found that in hearts stopped in extreme dilation by chloroform the application of ammonia would partially restore their rhythm. Dr. Wood, of Philadelphia, had attempted to antagonise the action of chloroform on dogs' hearts, but failed to get any restoration of rhythm by the hypodermic injection of either atropine, amyl nitrate, or caffeine, while alcohol only increased the cardiac depression. Ammonia had slightly beneficial effects, and digitalis, by raising the blood pressure, often averted death. Caffeine and atropine failed to restore the cardiac rhythm of the embryonic heart after a stoppage produced by chloroform. Possibly Wood's results with digitalin might be explained by the vaso-constrictor action of that substance. Small doses of strychnine increased both the force and frequency of the embryonic heart, but large doses were very depressant. Strychnine was well known to have a stimulant action on the respiratory centre in the medulla oblongata, hence it would promote the recovery of a failing respiration, which, if increased, would help to remove the anæsthetic and carbonic acid from the lungs of the person or animal. There was, therefore, a physiological rationale for the use of strychnine in chloroform syncope.

With reference to the suggestion of the use of interrupted electric current to restore the heart stopped by chloroform, chloroformed hearts would, if not too strongly poisoned, respond to electric stimuli, but it should not be forgotten that it had been shown that under certain conditions the effect of a local application of an interrupted

current to the heart was the production of an arrhythmic fibrillar contraction of the heart-muscle termed "delirium cordis," and not the production of the normal cardiac rhythm. Dr. Pickering had found that the direct application of heat would often restore a chloroformed heart when chemical and electrical stimuli failed, and therefore ventured to ask the Society if its members had tried the application of external heat in the form of hot rags over the heart in cases of chloroform heart-failure. From the experimental standpoint, and from its great simplicity, it might not be unworthy of trial, at any rate, in conjunction with other means of restoration.

The PRESIDENT invited discussion.

Mr. ROBBINS opened the discussion, remarking that his doing so needed explanation in view of the fact that he was not an anæsthetist; his object was, if possible, to bend the discussion in a practical direction. Speaking from an experience of somewhat over fifteen years, he might say that he could count on the fingers of one hand cases which had given him any anxiety in the matter of gas administration, but any day might come when it was not simply a question of starting respiration again or pushing the tongue forward and so on, but a case where the heart seemed about to stop. He would therefore like to ask the gentlemen, who were there, to give them some easy rules which they might adopt when the patient was *in extremis*, so that they should not lose their heads but know exactly what to do. One of the means mentioned seemed a very simple one, and that was the application of heat to the region of the heart. Hot water with them was always present, and it might be turned to useful account, at all events there would not be much harm done. He would leave the injection of strychnine for someone else to talk about.

Dr. DUDLEY BUXTON said that he regarded the paper, which Dr. Pickering had read, as one of pronounced merit, and among its chief points was that in it unfolded what was a novel method of investigating the physiological action of anæsthetics, *viz.*, by using the embryo heart. Much of what had been said, dealt with matters somewhat outside the daily work of members of that Society, and so he would devote himself rather to practical than philosophical disquisition. It was matter of much pleasure to hear that independent workers had corroborated the work, which he (Dr. Dudley Buxton) had some years ago carried out, in tracing the physiological action of nitrous oxide. That agent, he thought, was probably better in most cases than its more recently introduced mixtures, such as those with oxygen, and he thought that the lecturer's remarks upon oxygen would probably explain why after affects had been noticed, when nitrous oxide had been used in conjunction with oxygen. He regarded nitrous oxide as absolutely safe and thought any employment of chloroform when the other agent could be used as most unsatisfactory. He could only explain the erroneous views, which many eminent physicians and surgeons held about the action of nitrous oxide, by supposing that they mistook the phenomena due to the deprivation of oxygen which follows the use of the gas if nitrous oxide is pushed beyond the initial stage of its physiological effects. Nitrous oxide narcosis need not, if

carefully managed, give rise to the symptoms occurring when oxygen was suddenly withheld. Dr. Dudley Buxton then referred to the various plans used for resuscitation and said that he thought strychnine was a valuable perphylactic agent and he fully concurred with Professor Wood, of Philadelphia, in the good opinion he entertained of it. Hot water poured from a height upon the precordium had in some instances been tried and resuscitation had followed. Dr. Dudley Buxton then reviewed some of the points bearing upon the physiology of the subject.

Dr. SILK said it seemed to him, from a general point of view, that Dr. Pickering's paper confirmed in a very able and unique manner the observations of many previous workers. There was one point on which he (the speaker) was not very clear, that was with regard to the use of oxygen with nitrous oxide. He did not gather from Dr. Pickering whether he thought that the use of oxygen was of less importance than getting rid of the carbonic acid. Certainly what he had always taught, with regard to nitrous oxide, had been that it was not so much a question of suffocation, as it was a question of oxygen starvation. Oxygen starvation was the condition that gave rise to the troubles which were really the bane of dentists. For that reason Dr. Hewitt had introduced a very beautiful method of giving oxygen in combination with nitrous oxide. But there was the objection to the process that it was an extremely complicated one, and required the skill and ability of Dr. Hewitt to do it properly. If a similar good result could be obtained by the administration of small quantities of air, he thought they would get a very satisfactory condition of affairs. He had been dabbling a little in the process himself, and although he did not get such good results as with oxygen alone, he thought he could say he got a good deal of prolongation. Then there was another point, also a practical one, viz., the use of anything like what was known as a supplemental bag. He thought that the supplemental bag was a thing of the past, and very rightly so, but he was not sure that its abolition was not a little illogical. He was very pleased that Dr. Pickering should have confirmed the view that so many of them had held with regard to the use of alcohol, that was to say, that to all intents and purposes it was bad. He should certainly be very much disposed to accept that dictum. Many patients must come to dentists and ask if they could not have a glass of brandy, or something of that sort. It was wrong because they were very likely to get subsequent depression. Then as to means of resuscitation. The question of strychnine had been raised, at the suggestion mainly of Professor Wood. Certainly as far as he (Dr. Silk) had tried it, he had been very pleased with the results, and he thought that one need not wait always until the condition was such as to be highly dangerous, but that it was an advantage at a very early stage to make an injection of something like $\frac{1}{100}$ th or $\frac{1}{200}$ th of strychnine hypodermically, in cases of prolonged anesthesia, or in which a large quantity of blood was likely to be lost. Then there was the suggestion of heat by means of water. He spoke with deference, but he had some difficulty in believing that heat, applied to the region in that way, ever reached the heart at all. He was rather inclined

to think if the heart gained heat by such means it was the reflex action due to the stimulation of the nerve extremities rather than to the actual hot bath as applied to the heart.

Dr. HEWITT felt that they all owed a considerable debt to Dr. Pickering for his extremely able paper. He realised also that they had not time then to discuss the paper as it deserved, from the purely scientific side. He wished, however, to make a few remarks, more especially in connection with nitrous oxide. Dr. Pickering's observations had been of particular interest to him in regard to what he had said about the use of oxygen with nitrous oxide. He understood him to say that he used about 30 per cent. of oxygen, with 70 per cent. of nitrous oxide, and he threw out the suggestion that the increased formation of carbonic acid thereby caused, might be a source of danger. It was quite obvious that with that large percentage of oxygen, carbonic acid would be produced in a larger quantity than with the percentage of oxygen which he (Dr. Hewitt) ventured to advise the physician to employ. It was also clear that respiratory action would be feebler, than if smaller quantities, say 5, 10, or 15 per cent. of oxygen were used. When 5, 10, and 15 per cent. of oxygen was used, respiration was performed in very much the ordinary manner, and ventilation taking place freely, and all the natural processes were proceeding, one could hardly understand that there could be any possible danger from such a condition as Dr. Pickering had suggested. He (the speaker) believed the time would come when nitrous oxide would be administered with oxygen on *all* occasions. Although Dr. Buxton did not at the present time agree with it, for reasons he could hardly understand, he ventured to think that the time *would* come when all scientific members must adopt that particular method of procedure. He would go further and say that for the safety of patients the use of oxygen with nitrous oxide was strongly desirable. Before he used it he had to put out the tongue, compress the chest, and on one occasion to perform tracheotomy; since he had given oxygen with nitrous oxide he had never had the slightest occasion to pay more attention to a patient than if he had been administering air, or to take any remedial measures whatever. He believed that with the proper percentage there was absolutely no risk. He said that because he had carefully studied those cases, and he believed no one could bring forward one instance to the contrary. There was one practical fact he would like to state, which he believed to be of considerable importance, it was this, that the best stimulant they had to the heart's action was free respiration. In practice he believed the teaching of the Hyderabad Commission, although it had had some rather unfortunate results, had met with this corroboration, that when an overdose of chloroform was given, it was the circulation which was to a great extent primarily embarrassed. Stimulate the respiration, and they could stimulate the circulation. On one or two occasions it had happened at the hospital that they had had patients there in a condition of syncope, and they had given them nitrous oxide with oxygen, and watched their colour return and circulation improve. Only the previous week Dr. George Olliver was at the hospital with an ingenious instrument for

observing the pulse ; when oxygen was given with N_2O , the calibre of the pulse remaining full and good, and much better in tone than when nitrous oxide was given alone. A great many people people believed that when nitrous oxide and oxygen are used in combination, an imperfect form of anæsthesia is obtained, but the oxygen, as a fact, acted as a vehicle for the introduction of nitrous oxide, thereby enabling a deeper anæsthesia than otherwise obtainable.

Dr. PICKERING having briefly replied, a hearty vote of thanks was accorded him for the paper.

With the announcement that the next meeting would take place on the 8th of January, the meeting terminated.

STUDENTS' SOCIETY OF THE DENTAL HOSPITAL OF LONDON.

ORDINARY GENERAL MEETING, held Monday, December 11th. The President, W. H. WOODRUFF, Esq., in the chair ; the minutes of the previous meeting were read and confirmed.

The following gentlemen then signed the obligation book and were admitted members by the President, Messrs. E. P. Smith, W. Pidgeon, G. R. Spencer, J. W. Dalton, J. Workman, T. Lees, H. E. Atkinson, and G. Ross Bowtell. Messrs. W. Pidgeon and G. Macdonald were appointed as auditors of the accounts.

On Casual Communications being called for, Mr. G. Macdonald presented the Society with an upper canine one inch and a half long, the root being slightly sinus.

Mr. H. NORMAN presented a well marked case of dilaceration in a central extracted for chronic abscess from a boy of fifteen, he had severely cut and bruised his upper jaw when two years old. Mr. Mellersh showed a model (boy aged twelve) showing divergent centrals due to the presence of a supernumerary tooth and remarked that one of the causes of this irregularity is the attachment of the frænum to the inner side of the alveolus and that Mr. Watts had formulated a theory, an explanation of which may be of interest to the society.

Mr. WATTS said his theory was that in these cases the frænum was normally attached, but that owing to other causes (*e.g.*, teat-sucking), the temporary centrals protruded somewhat and their permanent successors erupting in the same direction produce a greater deformity.

Mr. MAY thought that in this case the frænum was still the cause.

Mr. COLYER said he supposed Mr. Watts meant that the teeth erupting prominent were thus separated by a normal frænum, but such teeth are not usually prominent and the frænum is attached far back ; there is also a peculiar V-shape divergence pointing to the action of the frænum, the division of which cures these cases.

The PRESIDENT thanked Mr. Colyer for his explanation, but thought these cases were often due to heredity, still, cutting the frænum usually cured them.

Mr. H. E. Mackley showed a left upper canine with a large shining wedge-shaped erosion cavity which had extended into the pulp cavity causing death and subsequent abscess, for which the tooth was extracted ; also a left central incisor from same patient similarly affected though to a less extent.

The PRESIDENT then called upon Mr. J. R. Freeman for his paper on Obturators. (See page 1.)

In the discussion following, Mr. G. NORTHCROFT said that they had just heard a most instructive and well thought out paper, and recommended that instead of using metal dies, in which to vulcanize the velum for a Kingsley obturator, plaster dies coated with silex should be used, as being less troublesome and quite as reliable. There still seems to be a notion that vela required six hours at a low temperature to vulcanize, whereas it could be done just as well in a short time at a high temperature. For making these vela, he recommended first making one in hard vulcanite and polishing it well, imbedding in plaster and then splitting the plaster with a saw.

Mr. MELLERSH wished to know who first introduced the method of taking impressions for Suerson's obturators in hard composition. He also suggested that Mr. Mackley might tell the meeting about an interesting case he had charge of recently which was successfully treated by means of a Suerson obturator.

Mr. TORPEY wished to ask with reference to the "box" of the Suerson, how much water was placed in it previous to vulcanization; if such water was really necessary, and lastly, what became of the water or steam, as the vulcanized rubber was not porous.

Mr. J. MAIN NICOL, after thanking Mr. Freeman for his paper, briefly referred to Mr. Torpey's question, and then described an accident that might occur on taking a plaster impression of an opening in the hard palate closed with moistened paper, the paper shifting and permitting the plaster to pass through the opening. He condemned as unnecessary an impression of the nasal surface of the margins of the cleft in the hard palate, and asked Mr. Freeman how he managed in taking the plaster impression *à deux temps*, to replace the first impression in the mouth when there were many natural teeth standing.

Mr. CLARENCE asked what kind of spring was meant in the first series of obturators; he also wished to add a word of warning as regards the bulb of the obturator, that it should not be extended back to the pharynx in such a way as to cause the tissues to ulcerate, as was the case of a patient who came to the hospital some two years since with an obturator made by a private practitioner.

Mr. MOSELY remarked that Mr. Freeman advocated treatment of cleft of the second class, *i.e.*, simple perforations of the soft palate by an appliance which had a bearing on the nasal surface of the soft palate. He thought such appliances were to be deprecated, and quoted a case treated at the hospital by Mr. Northcroft two years previously. In this case the denture had an extension of hard rubber fitting over the perforation and attached to the denture by a hinge, a spiral spring with the ends extended kept the back part in contact with the soft palate, while the hinge permitted free suction of the palate. The case was a complete success. Replying to Mr. Torpey, he had experimented with hollow rubber boxes, and obtained identical results with and without water, except that when water was used it remained in the box after vulcanization.

Mr. E. H. A. MACKLEY said that some time ago he had under his care an interesting congenital cleft palate case, for which he made a Suerson obturator in the manner described by Mr. Freeman, with the most satisfactory result. There was, however, one point that he would like to call attention to; after he had taken an impression of the cleft, and the patient bent forward his head, it was found that the posterior part of the impression pressed against the posterior wall of the pharynx in such a manner as to cause pain, consequently, he had to take another impression of the cleft with the head *well forward* before this trouble was overcome. In answer to Mr. Torpey, he might say that he made a hole in the hollow box after vulcanization; the water was, of course found inside.

Mr. SCHELLING reported the case of a woman twenty-five years old, who was operated on early in life, the operation being only partly successful, the posterior edges only remaining fixed together, leaving a large hole in the soft palate. She came under the care of Mr. Paterson, who made a hard rubber case with a shed going through the hole, but this was not a success, and was then changed for a full upper denture, with a Suerson's box placed in the opening. Four years later, she came to have a tooth repaired on the plate, and could speak uncommonly well, in fact, was acting as governess to a family.

Mr. NORMAN said with regard to Mr. Schelling's difficulty, a case occurred in America, in which the patient had undergone staphylophary, the operation being only partially successful in that a hole was left in the palate, as in Mr. Schelling's case, and consequently there was the same difficulty in introducing the obturator; it was therefore thought best to open up the cleft again, which was done, and an ordinary obturator inserted.

Mr. SCHELLING said that was also suggested in his case, but not adopted.

Mr. FREEMAN, in replying to Mr. Northcroft's questions, said that he had not tried painting the plaster mould with liquid silic, for he believed the great objection against using plaster for moulds to vulcanize velum in wax; the number of excrescences often found on its surface after vulcanizing, and which were very difficult to remove. He was glad to hear that the same results might be obtained in vulcanizing the velum for a shorter time at a higher temperature, as it would no doubt be of service when in a hurry. Mr. Mellersh's question had been answered by Mr. Colyer. Mr. Torpey's question as to what became of the water placed in the obturator had been replied to by several gentlemen. He thought that Mr. Clarence had misunderstood him when speaking of a spring, as he had only mentioned the word hinge in connection with obturators for closing perforations of the soft palate. In regard to Mr. Nicol's question concerning the paper slipping when taking the impression, he recommended the tray to be pressed into position in a vertical direction instead of the oblique as usually employed, he thought by so doing, less risk would be run in the plaster pushing the paper forward. He thanked Mr. Schelling for his remarks; he did not mention the form described by him and Mr. Norman, as he thought it better to confine himself to those most often required rather than explain all the different forms used which might probably have led to confusion.

A special vote of thanks was then passed to Mr. H. J. Mummery and Mr. A. Hopewell Smith for microscope specimens kindly lent by them to the Society. A vote of thanks was also accorded to Mr. Freeman for his paper, and to the gentlemen who brought forward Casual Communications.

The PRESIDENT announced that the next meeting would be the Annual General Meeting, held on January 22nd, when there would be the election of officers, and Mr. J. T. Hankey would read a paper on "Crown Work."

The proceedings then terminated.

. GENERAL MEDICAL COUNCIL.

DENTAL BUSINESS.

Sir RICHARD QUAIN, Bart., President, in the Chair.

1. The REGISTRAR reported that—the prescribed conditions having been duly fulfilled in each case—the names of the under-mentioned persons had been restored to the *Dentists' Register*, from which they had been erased in conformity with the provisions of Section 12 of the *Dentists' Act* (1878):

Bailey, Isaac; Bradbury, Samuel W.; Faulkner, Alfred Cooke; Green, Algernon Frederick; Haigh, William Ernest Parkin; Hickman, Sampson Ralph; Jones, Edward; Kelly, John George; Letty, Henry John; Mallan, Albert E.; Pratt, Henry; Tayler, John Sinclair; Warrington, Charles Bower; Williams, Harold.

2. The Committee considered applications from the following persons, who hold American Dental Qualifications recognised by the Council prior to May 29, 1893, and who urge that they should be allowed to be registered on the ground of having commenced their course of study for these diplomas—in several cases long previously—in the belief that they would constitute registrable qualifications, and received no sufficient notice to the contrary:—

George William Field, D.M.D., Univ. Harvard; Edward M. Quinby, D.M.D., Univ. Harvard; G. Rufus Gray, D.D.S., Univ. Harvard; L. N. Seymour, D.D.S., Univ. Michigan; B. C. Hinkley, D.D.C., Univ. Michigan; E. D. Hinkley, D.D.S., Univ. Michigan; E. G. Snodgrass, D.D.S., Univ. Michigan.

Resolved:—"That these gentlemen be informed that they cannot be admitted to registration unless they can prove that they had passed through a curriculum equivalent to that demanded by the Medical Council from the Licencing Bodies of the United Kingdom."

3. *Read*.—The following communication submitted to the Council in regard to the Royal College of Surgeons in Ireland, and Dental Apprenticeship :—

(a) From the British Dental Association,

40, Leicester Square, W.C., *October 31st, 1893.*

“The Representative Board of the British Dental Association beg to call the attention of the Medical Council to the unsatisfactory character of the answers of the Royal College of Surgeons in Ireland to the remonstrance of the British Dental Association, regarding the course which the Irish College have pursued in eliminating the prescribed period for instruction in Mechanical Dentistry from their Dental Curriculum, and respectfully suggest to the Medical Council that no important change in the curriculum should be made by Licencing Bodies without the full concurrence of the Council.

They therefore humbly request the Medical Council to withhold the registration of the Diploma of any Licencing Body which fails to comply with regulations laid down. (*See page 11, Clause 21, of the Resolutions of the General Medical Council in regard to the Registration of Medical and Dental Students.*)

(Signed) S. J. HUTCHINSON,

President of the Representative Board.

W. B. PATERSON, *Honorary Secretary.*

To the PRESIDENT and MEMBERS of the

EXECUTIVE COMMITTEE of the MEDICAL COUNCIL.

The communication was supported by a petition from registered dental practitioners; a letter from the Dean of the Dental Hospital of London; and resolutions passed by the respective staffs of the Glasgow Dental Hospital, the Victoria Dental Hospital, the Liverpool Dental Hospital, the Edinburgh Dental Hospital, the National Dental Hospital.

Resolved.—“That the foregoing communications, together with a letter from the Royal College of Surgeons in Ireland, dated January 15th, 1893 (*Minutes*, vol. xxx., pp., 106, 137), be referred to the Education Committee, with a request that the Education Committee report on the facts to the present Meeting of Council.”

(*Which it was unable to do.*)

A communication in regard to advertising by registered dentists was read; it was supported by a petition of 130 registered dentists in Great Britain and Ireland.

Resolved :—"That although the Council would probably consider advertising as unworthy of and unbecoming the character and dignity of a learned profession, and would recognise the effort of the applicants to raise the general status of their profession, yet they had not hitherto regarded advertising as in itself infamous even in the case of qualified Medical Practitioners. No man has been struck off either the *Medical* or the *Dentists' Register* solely on account of his having advertised. No rule against advertising has been laid down by the Council; and there are a large number of registered dentists who, probably not having as high a standard as the petitioners, are in the habit of advertising themselves and their wares very largely. The Executive Committee therefore do not advise the Council to lay down any rules on the subject, but to act as they have hitherto done, dealing only with cases where the nature of the advertisement calls for special attention."

DENTAL ADVERTISING.

Mr. BRUDENELL CARTER moved that—

"The attention of the Council having been called to the practice of advertising as pursued by certain dentists, it is hereby declared that, while the Council will not at present interfere with this practice so long as it is confined to a mere notification of the place of abode and the profession of the advertiser, yet that the publication of a scale of charges, or the issue of advertisements containing claims of superiority over other practitioners, or unfair depreciation of them, will be regarded as an offence with which the Council will be prepared to deal, and which may easily be carried so far as to constitute infamous or disgraceful conduct in a professional respect."

He said : I think I need not detain the Council many minutes. It will be remembered that this Council laid down a declaration of policy with regard to questions of covering before it proceeded to the question of a penalty for that offence. Many irregular dentists who now issue exceedingly objectionable advertisements, and who would seem to wish at once to possess the privileges of belonging to a profession, and the freedom which is permitted to a trade, must I think, be warned in some way or other that that business is an improper one, and that the class of advertisements which any of them now issue, are such as to call for the interference of this Council. A declaration of this kind practically binds the Council to nothing more than to consider any charge of objectionable advertising brought

before them, together with issuing a warning that such advertising is so objectionable as to call for a penalty. I beg to move the resolution.

Sir DYCE DUCKWORTH : I beg leave to second that proposal. I think the statement made by Mr. Brudenell Carter renders the meaning of the motion unmistakably. The public are demoralized, and the dental profession greatly disgraced by the quantity of these advertisements to be seen in all parts of our large cities and towns, emanating from a class of people who have been hitherto almost artisans, but who have suddenly been put into the ranks of the profession and have come on to the Register, and as yet they do not appear to know what position they occupy. It would be a great injury to the reputable and worthy members of the dental profession if the names of the people to whom I refer must be retained on that book alongside of theirs. We may feel quite sure that the dental profession in this country will never occupy the position it ought to do until the nefarious practices of the class of persons I have been speaking of are done away with, yet the time will very soon come when it will be within the scope of the work of this Council to visit very strongly the cases of gross professional offence which are so rife. Just as in the veterinary profession, so long as the members of that profession are, to so large an extent as they are, blacksmiths who preside over forges, so long must veterinary medicine in this country remain in a very degraded and disgraceful state. And not until a divorce takes place between the forge and the scientific veterinary medicine and surgery, shall we have a proper school a veterinary medicine or surgery. So it is with dentists; so long as these offensive advertisements are about, a disgrace to the profession, so long the profession will never hold the position which it ought to do, and which some day, by the action of this Council, we hope it will hold. We must notice a contrast in the conduct of this Council. Some people were, if anything, a little too severe in judging upon the question of examination standards, and the same critics will tell us that, if anything, we are a little too lax in dealing with matters of disgraceful conduct. I do think in all these cases the time has not yet come, but I hope it will, when the Council will have the courage of its opinions, and will deal with these matters very sternly indeed. The time is rapidly coming when we must take such steps, and I hope it will be

intimated to all who are guilty of this conduct, that they will not be allowed any longer to practise in the way they have been doing, and that this Council will be prepared to deal very sternly with them.

Mr. WHEELHOUSE : Would not it be well in the last line to take out the words, "or disgraceful" ?

Mr. BRUDENELL CARTER : They are in the Act of Parliament.

Dr. MACALISTER : I quite agree with the remarks that Mr. Brudenell Carter has made, but in the case of the famous definition of covering, with regard to dentists, we took the precaution to have our lawyer look into it, because it did seem very much like a judgment in advance, and it was extremely necessary that we should, in issuing any notice to dentists with regard to advertising, say that we were within the limits of our Statute. I should like to ask whether this question has been submitted to our lawyer. If not, I shall move, as an amendment, that it should be so, that we may make the definition in such a form as may not be objectionable, if our judgment is appealed against.

The REGISTRAR : The Council's lawyer made a statement before the Executive Committee.

The PRESIDENT : To what effect ?

The REGISTRAR : As far as I remember, it was to the effect that the Council could hardly take it up and declare it to be infamous conduct in a professional respect.

Mr. BRUDENELL CARTER : The resolution was communicated to us by the Executive Committee. I observe that clause three of the resolution deals with advertising only. It appears to me that advertisements such as I have indicated might easily be carried so far as to constitute infamous conduct. It does not say that it does so, but it may be so. It leaves it to the Council to judge in individual cases.

Dr. MACALISTER : I should like to move an amendment, that this definition, which seems an admirable one, should be referred to our legal adviser before we act upon it.

Mr. BRUDENELL CARTER : I have not the slightest objection if Sir Dyce Duckworth will agree to that, namely, that it be referred to the Executive Committee for submission to the legal advisers of the Council.

Dr. MacAlister's suggestion was agreed to by the Council, and the matter dropped.

THE CASE OF CHRISTOPHER PALMER.

The REGISTRAR said Christopher Palmer, who was registered as in practice before July 22nd, 1878, had been summoned to appear before the Council on the following charge :—

“ That, being a person registered in the *Dentists' Register*, he acted as cover of and, by permitting the use of his name, enabled an unqualified person named Frederick William Rose, to carry on the business or profession of a dentist, and to practise as if he were duly qualified and registered, such practise by Frederick William Rose being carried on in Palmer's name at Houndsgate, Nottingham.”

The case had been considered by the Dental Committee who reported as follows :—

“ The case of Christopher Palmer having been referred to them by the Executive Committee to ascertain the facts in regard to such cases, the Dental Committee find the facts to be as follows :—

“ That Christopher Palmer was registered in the *Dentists' Register* on September 19th, 1878, as having been ‘ in practice before July 22nd, 1878,’ and with the address, Montange Villas, Thurston Road, Lewisham, London, S.E.

“ That Mr. Palmer is accused of acting as cover of, and, by permitting the use of his name, enabling an unqualified person named Frederick William Rose to carry on the business or profession of a dentist, and to practise as if he were duly qualified and registered.

“ That such practice by the said Frederick William Rose is carried on by him at Houndsgate, Nottingham, and he retains Mr. Palmer's name on the premises, and practises in Palmer's name.

“ That the alleged covering by Mr. Palmer of Mr. Rose was brought to the attention of the General Medical Council by Mr. Hugh Woods, the Secretary of the London and Counties Medical Protection Society, Limited.

“ That in support of his complaint the following documents have been put in by Mr. Woods, and read at this enquiry, *viz.* :—

“ An Affidavit of Thomas Bradbury, of 7, Beacon Street, St. Ann's Well Road, Nottingham, sworn October 5th, 1893, and the Exhibit No. 1 therein referred to.

“ An Affidavit of Henry Blandy, Dental Surgeon to the General Hospital, Nottingham, sworn October 5th, 1893.

"An Affidavit of Francis Dawson Blandy, of 1, Postern Street, Nottingham, sworn October 5th, 1893.

"A letter dated September 28th, 1893, addressed from 1, Hounds-gate, Nottingham, and signed C. Palmer.

"Mr. Palmer denies the charge, and states by letter that he sold the business to Rose at the beginning of the year, at which time all his signs and advertisements were painted out, and that he has done all he can to have his name withdrawn from the premises.

"The Committee recommend the Council to postpone the case for further explanation by Mr. Palmer."

Mr. FARRER, the Council's Solicitor, said: Mr. Palmer is not here. I have a letter from him saying that he cannot attend. He was duly summoned before the Dental Committee and he did not appear to that summons, and now he says he cannot appear to this. But I think that that is of less consequence because the Committee who find the facts recommend the Council to postpone the case for further explanations by Mr. Palmer. The only fact that really is found is that Palmer sold his business to an unqualified person, named Rose. Rose has continued to have Mr. Palmer's name up, as I understand it, but Mr. Palmer says he has done his best to stop him. We asked Mr. Muir Mackenzie at the Committee whether there was any legal mode open to Mr. Palmer, to put a stop to this, and he said, No, he did not think there was; whereupon Mr. Hugh Woods, the complainant, I think, went away satisfied that the case was not at present ripe for him to push any further, and he does not either appear to push forward the complaint. I would ask the Council if they would kindly adopt under the circumstances the recommendation of the Committee that the case be postponed for further explanation by Mr. Palmer. If we may be in camera for a minute I think I can show some reason for that, but if you agree without further explanation to act on the report of your Dental Committee, there is no occasion for strangers to withdraw.

Sir WILLIAM TURNER: I move that the recommendation of the Dental Committee in the case of Mr. Christopher Palmer be adopted.

Mr. WHEELHOUSE seconded the motion, which was agreed to.

The correspondence between Mr. Tracey and his Solicitor, and the Solicitor and Officers of the Council, was referred to, and the Council instructed the Solicitor and Officers to take no further notice of Mr. Tracey's communications.

THE DENTAL RECORD, LONDON: JAN. 1, 1894.

OUR CORRESPONDENCE COLUMN.

FROM time to time it is our privilege, and a very great one it is, to publish letters on various matters in these pages. The days when friend sent friend a lengthy budget of news may have gone, indeed the need ceased to exist when the telegraph transmitted and the newspaper published, all the exciting events of town and country, long ere we should have made up our mind to write, much less have written, the aforesaid letter. Public news may, therefore, have ceased to be an incentive to correspondence, but there remains not only those little items of intelligence, which interest those moving somewhat in the same groove, but also the individual opinion of the writer on events, ideas, schemes, methods, and so on. How pleasing it is, for instance, to learn from a fellow professional what are his views as to any special action taken by our public bodies, or what may have been his experience with some new method, material or instrument. If, then, the private individual finds such correspondence profitable, would it not be more so when there is not one, but many readers? All of whom may be able to throw some new light on a question, or, perhaps, further develop the improvement that the original letter may have suggested. Now, we do not wish to have a little private grumble all to ourselves, but we would broadly affirm, that in regard to this matter, no more apathetic body of men exists than the Dental Profession. Take our own columns or those of any of our esteemed contemporaries and this truth is at once apparent. It is not that the dental practitioner has no interest in current questions or thoughts, on the contrary.

pin him by the button-hole and you will find him burning, with indignation over this point, in ecstasy about new methods, or quietly self laudatory concerning some original idea. Grumble too, he will, that he knows so little of the inner life of the profession, of what his fellows are doing what his leaders are planing. Does it never occur to him that we are all equally in the dark concerning his own views? Letters to a newspaper are of course not the only way by which expression may be given to thoughts and fancies, but they possess this advantage over discussion at Society meetings, that they can be written quietly at the desk at home, well thought over, and the words well weighed. We would therefore urge upon our readers the need of coming more to the front in this matter, or, if they be too humble to wish to occupy a conspicuous position, they might still give us the benefit of their advice and opinions, and themselves remain behind the screen of a *nom de plume*. One stipulation only we make, and it is that personalities be avoided. Such a rule may seem needless, but we regret it has been necessary sometimes to tone down a letter, the writer of which has possibly not fully realised how pointedly personal his words read to a third party. Thus, pain is given even unintentionally, and the subject matter passes out of the regions of debate into that of mere personal wrangling, productive of no good but much unpleasantness. Short of personalities, therefore, we gladly welcome letters treating of points of dental interest from any point of view, and we cannot help feeling that our readers would reap an ample reward would they take the hint we drop with all gentleness.

News and Notes.

WE regret to notice the death of Mr. W. Caleb Williams, of the Parade, Leamington.

THE British Dental Association have resolved that in future they will not contribute more than £100 towards the expenses of the Annual General Meetings. The balance must be met by the inviting branch.

Mr. LEE RYMER has been elected Mayor of Croydon.

THEY do things better in Germany.—A vulcanizer having burst in Bremen, the police of that city, have issued the following notice to all dental practitioners :—" A short time ago a vulcanizer belonging to a local mechanic exploded with such violence that considerable misfortune would have resulted but for a favourable coincidence of circumstances. The Director of the Police feels, therefore, obliged in future only to allow the use of vulcanizing apparatus, for the hardening of dentures, when they are provided with a controlling regulating guage and sufficient safety valves. Should the vulcanizer in your possession be unprovided with these safety valves you are directed to submit the same to the Inspector of Factories at latest by January 1st, 1894." A sensible notice this which cannot but be productive of good. A vulcanizer is not exempt from the rule that everything has an end, and as years go by the number of those which are worn out must considerably increase. Fortunately the Britisher's weakness for something solid stands him in good stead in the question of vulcanizers, very few accidents, we believe, have happened with those of home manufacture.

A CURIOUS incident occurred recently in the theatre, at Havre. After the performance of the first act of the tragedy, " The Pirates of Savannah," the attendants appeared and begged the audience to remain seated. The cause of this curious request was soon apparent. A lady sitting in the front row of the second balcony and leaning over the rail had sobbed so violently that she had ejected her dentures, which had fallen into a passage below. After much searching the denture was recovered and she is said to have remained to the end of the performance, and to have sobbed on but with more circumspection.

THE *Allgemeine Medizinische Zentral Zeitung* gives the following prescription of H. Paschkis, for covering the odour of Iodoform :

Recipe—

Iodoformi	...	...	(aa	4·0
Caolini	...	...
Acid. carb. cryst.	...			0·5
Ol. menth. pip.	...	m		10.

The peppermint is used as a perfume, the smell of the Iodoform disappearing as it is rubbed up with the crystals of carbolic acid.

Dr. JUNG narrates a curious case of transposition of a canine in the *Deutsche Monatsschrift für Zahnheilkunde*. A servant, aged 20, complained of a loose upper central incisor of the left side, this showed no signs of decay but on being extracted the root was found considerably absorbed and under it was the point of the canine, which was absent on that side of the mouth. This case, we may add, may certainly bear on the question of the absorption of the roots of temporary teeth. Grant, as we all must, that a soft absorbent organ does the actual work, yet may not the formation of this be due to the advancing permanent tooth? And because the absorption sometimes begins away from its own successor does this upset the rule? Is it not even possible that even these cases may be due to pressure, possibly of the permanent successor of the neighbouring tooth? How, too, do we know that, though the permanent does not always immediately succeed the absorbed temporary tooth, it is not there, and has not started the process of formation of an absorbent organ? Certainly absorption of limited areas of tissue rarely occurs unless due to pressure of some sort or another.

WE regret to notice the death of John H. Carter, of Leeds. Mr. Carter had reached the ripe age of 81 years, and since 1876 had relinquished the practice of the dental profession.

MR. OLIVER PEMBERTON, city coroner, held an inquest at the Victoria Courts, Birmingham, on December 27th, upon the body of Leonard Alfred Barker, aged eleven, who resided with his parents at Woodleigh, 21, Littlemoor Hill, Smethwick.—Alfred Barker, the father of the deceased, stated that the latter, who was a very healthy lad, had had some trouble with his teeth recently, and on the 13th was taken to see Mr. Cave, surgeon dentist, of Bennett's Hill. Mr. Cave recommended the extraction of four molar teeth, and thought it would be wise that the operation should be performed whilst the patient was under chloroform. An appointment was made for last Tuesday, and Dr. Carter promised to attend. Witness, who was a

commercial traveller, sent his written consent to the operation, and the boy was accordingly taken to Mr. Cave's by his mother. At a quarter to six o'clock witness received a telegram calling him to the dentists, and on arriving there was told that his son was dead. Witness desired to say that in his interview with Dr. Heaton he asked whether a second doctor had been called in to aid in the attempt to induce artificial respiration. Mr. Heaton said he had called in a Mr. Mountford, who was a partner of Mr. Cave. Mr. Cave said that he had practised as a dentist since 1867, and the deceased's parents had been patients of his for some years. Deceased was brought to witness on the 13th, and witness advised the extraction of four molar teeth. Feeling that it might be a painful and difficult operation, witness recommended the administration of chloroform, and assent was given by the parents. Arrangements were made that Dr. Carter should be present, but he was unable to attend, and sent Mr. George Heaton in his place. The chloroform was administered by him, and witness quickly performed the operation, which was not attended by the difficulty anticipated. A few minutes later Mr. Heaton said he was alarmed about the deceased's pulse, and that he had collapsed. Artificial respiration was at once resorted to, and was continued for an hour under Mr. Heaton's directions, but without avail. Mr. George Heaton, assistant surgeon at the General Hospital and surgeon to the Children's Hospital, said that he had had a large experience in the administration of anæsthetics. He had given anæsthetics of every kind in more than 1,500 cases. He gave deceased four or five drachms of chloroform and ether mixed, in the proportion of three-parts of the former to one of the latter. Chloroform was the best anæsthetic to administer to children and old people, but he put the ether in to counteract the depressing effect of the other anæsthetic. Previous to the administration of the anæsthetic witness satisfied himself that the lad was a fit subject to take it. The deceased was under witness's care during the operation, and when his pulse began to fail he was inverted, and artificial respiration was tried, while ether was injected under the skin. All their efforts were unsuccessful. Dr. Wilders said that, having heard the evidence, he considered that the anæsthetic had been administered in a minimum quantity. A post-mortem examination showed that deceased's organs were thoroughly healthy, and he was a proper subject for the administration of an anæsthetic. Death was caused by syncope, the result of taking the chloroform. By Mr. Bradley: It was impossible to account for death under such circumstances. A strong, healthy man might die, whereas an elderly person with a diseased heart might recover. Mr. Bradley himself, who was apparently strong and healthy, might take chloroform and be dead in five minutes, and, added Dr. Wilders, "I should be very sorry if you did." The Coroner, in summing up, remarked upon the small number of deaths which were caused by anæsthetics. Two patients out of every 7,000 died. The jury returned a verdict of "Death from syncope, caused by the administration of chloroform," and added "that no blame attached to anyone."

AN action was tried at the Liverpool County Court on December 12th, in which Moses Abraham Prenslan, surgeon-dentist, Great George Street, Liverpool, sued Captain Charles Semple, to recover £8 8s. for three sets of artificial teeth. Defendant had paid three guineas into court as sufficient to meet the claim. The plaintiff deposed that the defendant asked him to make a set of teeth for his wife. The order was executed at the price (three guineas) arranged with Captain Semple. Mrs. Semple expressed satisfaction with the set, and ordered a second set. When this order was given defendant was present, and the price was to be the same as that for the first set. Captain Semple afterwards ordered a set for himself, the price for which was fixed at £2 2s. He, however, never called to have the set fitted to his mouth, and had not paid anything for any of the sets. The second set had not been delivered, but they were ready for the defendant whenever he liked to have them. Defendant in his evidence said, there was a distinct understanding that the price for his wife's first set was to be £2 2s., and for the second set £1 1s. Plaintiff some years ago had made a set for Mrs. Semple, and the gold of that set was to be worked up in the second set. He inquired the price of a set for himself, and plaintiff took a cast of his mouth, but the teeth were never ordered, because plaintiff did not let him know the cost before going on with the work, as he had undertaken to do. His Honour said it was a case of oath against oath. The only corroboration he had was in favour of the defendant, who had received a bill from plaintiff with the words, "To amount of account rendered £3 3s." Defendant had paid that amount into court, alleging that it covered both the new set and the renovated set for his wife. It was reasonable and probable that the plaintiff had asked to be told the cost of a set for himself before giving the order, and he had sworn that he had not received that information. Plaintiff was not entitled to be paid for that set, and he (the judge), considering that the amount paid into court was sufficient to cover the claim, would give a verdict for the defendant. No costs would be allowed.

At the meeting of the College of Surgeons of England, held on December 14th, the following gentlemen, having passed the necessary examinations, were at the same meeting admitted Licentiates in Dental Surgery:—

Arliss, Percy, Charing Cross and the Dental Hospitals; Ashby, Herbert Grimsdale, Charing Cross and the Dental Hospitals; Badgery, William, Charing Cross and the Dental Hospitals; Bailey-King, Francis Henry, Middlesex and the Dental Hospitals; Baker, W. Henry Griffiths, Charing Cross and the Dental Hospitals; Bostock, Arthur Leigh, Owen's College and the Dental Department, Royal Infirmary, Manchester; Bowden, Edwin, Charing Cross and the Dental Hospital; Brimmer, Arthur Vilder, Guy's Hospital, Dental Department; Bromley, Frank Charles, Guy's Hospital, Dental Department; Brown, Leonard, Charing Cross and the Dental Hospitals; Bulgin, Robert John, Middlesex and the Dental Hospitals; Burroughs, Joseph Henry, University College and the Dental Department Royal Infirmary, Liverpool; Carpenter, Frank Holly, Guy's Hospital Dental Department; Carpenter, Sidney Henry Mark,

Guy's Hospital, Dental Department; Clayton, Edward, Guy's Hospital Dental Department; Coles, Ernest Victor, Charing Cross and the Dental Hospitals; Densham, Ashley Bloomfield, M.R.C.S., Eng., King's College and the Dental Hospitals; Densham, Walter Arnold, Charing Cross and the Dental Hospitals; Dunlop, David, Charing Cross and the Dental Hospitals; Evans, Albert John Gear, Charing Cross and the Dental Hospitals; Freeman, John Robert, Charing Cross and the Dental Hospitals; Gabell, Wilfrid William, Charing Cross and the Dental Hospitals; Haines, Charles Frederick, Mason's College and the Dental Hospital, Birmingham; Hankey, John Trevor, Charing Cross and the Dental Hospitals; Henly, Arthur William, Charing Cross and the Dental Hospitals; Jones, William Meredith, Charing Cross and the Dental Hospitals; Keele, Stephen, Guy's Hospital Dental Department; Knight, Ernest Vincent, Guy's Hospital Dental Department; Love, Hugh, Charing Cross and the Dental Hospitals; May, Walter John, Charing Cross and the Dental Hospitals; Mellersh, William Francis, Charing Cross and the Dental Hospitals; Myers, Lancelot Brainard, Middlesex and the National Dental Hospitals; Parfit, John Brodribb, Guy's Hospital, Dental Department; Pickering, Harold John, Charing Cross and the Dental Hospitals; Rowe, H. Burberry, Middlesex and National Dental Hospitals; Satterthwaite, Robert, Middlesex and the Dental Hospitals; Summerling, Arthur Newton, Charing Cross and the Dental Hospitals; Walker, Frank, Charing Cross and the Dental Hospitals; Wallis, Ferdinand Hammans, Guy's Hospital, Dental Department; Ward, Richard Robert, Middlesex and the National Dental Hospitals; Watts, George William, Charing Cross and the Dental Hospitals; Webb, Gerald Bertram, Guy's Hospital Department; Wheatley, Rupert, Middlesex and the Dental Hospitals; Whitworth, Geoffrey Guy's Hospital Dental Department; Williams, George, Guy's Hospital, Dental Department; Wood, Walter Robert, Guy's Hospital Dental Department.

Seventeen candidates were referred back to their professional studies for six months.

THE DENTAL HOSPITAL OF LONDON.

THE STUDENTS' DINNER.

THE Annual Dinner of the Staff and Past and Present Students of the Dental Hospital of London, took place in the Whitehall room of the Hotel Metropole, on December 2nd.

Mr. J. W. HULKE, F.R.S., the President of the Royal College of Surgeons, in the Chair. He was supported by a company numbering about 160, amongst the visitors we noticed Dr. C. J. Hare, Dr. J. Walker, Mr. Stanley Boyd, Dr. S. Coupland, Mr. E. Trimmer, Mr. F. G. Hallet, Mr. Bowman Macleod, Dr. Withecombe, Mr. Bland Sutton, Mr. S. Spokes.

The recitations and songs given after the dinner were exceptionally amusing and well up to the standard for which these gatherings have gained some reputation. Those who contributed to this part of the programme were Mr. Fred Cozens, Mr. Frank Braine, Mr. F. Breeze, Mr. W. H. Clarke and Mr. George Giddens, whilst Mr. Tom Browne, whistled with an effect, that was highly appreciated by his audience.

The *menu* was choice and the dinner altogether particularly well served.

H.M. the Queen having been duly honoured, the Chairman gave "The Past and Present Students." Mr. Hulke said he was quite sure these gatherings must be always looked forward to by Past Students with the very greatest pleasure, as it brought altogether, from all parts of the country, many who the rest of the year were separated. It afforded them the opportunity of renewing old friendships, comparing experiences, and they were also able to visit their old hospital, see what progress it had made, and make the acquaintance of the Present Students. He himself had had the very great pleasure of visiting the hospital, and he could not but be struck with the extreme value and practical stamp of the teaching there given. He might perhaps be allowed to indulge the wish, that every Present Student would exercise himself to the utmost to take every advantage which such a magnificently equipped hospital, supplied for obtaining a thorough good grounding and foundation in the profession to which he was going to devote his life. There was one sense in which everyone should be a Present Student. Unless they retained the student habit to the end of their days, he could not help thinking that their lot could not be a very happy one, however much their hearts might be in their work. He would wish everyone to cultivate the philosophical habit throughout life, and then indeed he would find in it a satisfaction and solace amidst all the various reversals which inevitably befall each one. He was not the oldest person in the room—happily he had a gentleman on his right (Dr. Hare) who was by far his senior—still in his time it had been tolerably startling to see the enormous advances that dental surgery had made. He remembered as a child and afterwards, the punishment he sometimes submitted to in the extraction of teeth and so on. But he recollected very well as a schoolboy, finding often in the afternoons great delight going to the blacksmith's forge close by. Over the door was the representation of a bird, under which came the words "Teeth drawing, bleeding, and cutting done here." The

blacksmith certainly worked very expeditiously and he always pulled out that which he aimed at pulling out. The instrument he used was a pelican. He doubted whether there were a dozen people in the room who had ever seen a pelican, but it had a sharp beak, and when the smith got it well down to the root of the tooth something came out, for the operator's hand was strong, and he was not very merciful. He also remembered being at Auvergne on a market day, and there he saw a small waggon drive up, from which a man came out and made a little harangue to the people. He was ready to draw their teeth and cut their corns, indeed he did so, and meanwhile one man blew a horn and another beat a drum. Such was the condition of dental surgery in remote country districts, both in France, in Germany, and in our own country. Later still, when he became an apprentice in the country, he did not believe there was a single person who knew anything about the conservation of teeth, all they knew about was pulling them out, and lancing the gum. And so country apprentices getting very great practice in that way, became rare dapsters in pulling out teeth, which they did for one, two, and three shillings. Little as that might seem, it was rather better than the reward that fell to the royal dentist; for they knew in this country there was once a king who practised as an amateur dental surgeon, James I. There were to be seen in some of the old records and, yes, from time to time entries such as this: To so and so two shillings for letting the king pull one of his teeth. James also paid a few shillings for the pleasure of bleeding a person. He was a very enquiring king in those directions. When one reflected upon the wonderful strides that had been made, one could not but be gratified in feeling that the advances so far as this country was concerned had been almost identical with the progress of your hospital. The two had been intimately bound up together, and evidently the Dental Hospital had been the pioneer in all these advances, and must continue to be so. No doubt the times were bad, and they might have some difficulty in raising the large sum required for rebuilding the premises, but "all comes to those who wait" and it would come to them, and they would rebuild their premises, and their classes would doubtless continue to increase. He gave the toast of "The Past and Present Students."

Mr. T. S. CARTER, on behalf of all Past Students desired to express the strong feeling of loyalty which they had for the hospital. The hospital had enabled them to become successful practitioners,

whilst the College of Surgeons bestowed the diplomas, which gave them their status. He assured Mr. Hulke that nothing gave the past students greater pleasure than to meet at those re-unions.

Mr. W. MAY, replying for the Present Students, was sure when the accommodation was in proportion to the efficiency of the staff the hospital would not only be the best in the kingdom, but about the first in the world.

Mr. STANLEY BOYD proposed "The Hospital and School." The Dental Hospital of London formerly occupied a position in the field without a rival almost. Of late years, however, rivals had sprung up, one or two of which were formidable. They were so because they had admirable hospitals, ample room, with every convenience for the treatment of patients. The Dental Hospital had such fame that its students had increased greatly in number, and they were now cramped for room, and the fittings were not now such as those interested in the institution desired them to be. The only way to remedy this had been taken. It was seen it was necessary to rebuild. There was no need to say one word with regard to the rival institutions, there was ample room for all. But it was necessary that the Dental Hospital of London should be, as he had no doubt it would be, the first Institution of the kind, not only in Great Britain, but in the world, and in order that that might be brought about it was necessary to raise £40,000. He was very glad indeed to hear that the subscription was going on satisfactorily, and he could not avoid expressing his admiration of the way in which they had helped themselves; the way in which the staff and those who had received their education within the walls of the Dental Hospital of London had come to the assistance of their alma mater in its time of need had been most praiseworthy. They had had a committee which had not shrunk from undertaking the heavy task laid upon it, and as its Chairman, they had one of their most distinguished physicians, typifying, he hoped, that interest which general medicine now took in dental surgery. They had a Dean, in whose presence he would not say much, but he would say this, that he regarded him as a model Dean, whose heart and soul were wrapped up, he believed, in the cause of the Dental Hospital and School, and the welfare of the students. They had an admirable Secretary. They had a Staff, which was, he believed, the most brilliant amongst all the staffs of the kind in Europe, and he was sure that every member of that staff was keenly interested in the success

of the students, and the students themselves were, as a whole, a very hard-working body of men, amongst whom he had found some of the best that had come under his notice. Knowing what he had stated to be facts, he had not the slightest doubt that the Dental Hospital of London would attain the position Mr. May had foretold for it.

Dr. CHARLES J. HARE in responding, said, the lady whose health had been drunk felt she was deserving full well of the commendations that had been bestowed upon her, that for many long years she had been endeavouring to do her duty, and she felt a kind of inner consciousness that she had done that work very well indeed. She had carried on with limited accommodation the education of a very large number of young men, and turned out most brilliant specimens of the profession belonging to a noble department, and she felt also that during that time she had given noble mitigation to the pains of the human race. But she felt she had performed all that work in somewhat difficult circumstances. She had been cramped and confined and had not had the power of doing what she intended to do in the future. It was a great gratification therefore that they were going to give her a better habitation. And she knew that her welfare was placed in the hands of those whose zeal was unbounded, and that she associated with the probability of her future habitation, the names of Dr. Walker on the one hand and Dean of their Faculty on the other. She was therefore sure that the work commenced would be well finished, and feeling that she revived with very great satisfaction, having thanked them for the way in which they had honoured her toast.

Mr. DAVID HEPBURN said he was very proud to be called upon to respond to the toast of "The Dental School." He was particularly pleased that the two apparently different institutions—the Dental Hospital of London, and the London School and Dental Surgery, should have been so closely associated and coupled in the same toast; for the hospital could not possibly exist as such without the school, and the school would find great difficulty in carrying on its teaching without the special and necessary assistance which was supplied to it by the hospital. More than thirty years ago the necessity of associating the two occurred to some very remarkable men. The originators of their institutions were men who obtained their own professional experience and ability without any course of technical training, because until the

hospital was founded there was no such thing as any recognized or systematic training for the benefit of the student. The history attached to their school was a very great and very important one. It behoved them to keep up the old traditions, and even more than that, to keep, if possible, apace with the times, and to establish lines of training for dental students which should tend in future to meet every requirement. They had had in olden times an admirable staff of teachers, and at the present time they could not but think of one circumstance, which was that they had just been separated, as it were, from one who was the last remaining link of the old set. He referred to Mr. Gregson. He was a kind friend to many of them, and they had worked with him many of them as colleagues. They knew his work and felt his loss. They were very proud of their school. They had a good school, and for many years they had set the lead in these matters, and he (Mr. Hepburn) trusted they would continue to do so. They had rivals now, but he might say that they simply welcomed those rivals with open hands. They sincerely believed that all the new institutions which had sprung into existence were only means to further the progress of the profession, and that from the friendly rivalry which now existed, much good would accrue. He could not on this particular occasion refrain from saying that he felt much in the school depended upon their Dean. Much in the future lay in their own hands. Much might be done by licensing boards, much by legislative councils and by Acts of Parliament, but he believed that one way to leaven the mass and to elevate the status of the profession was by flooding the country with rightly prepared and rightly minded professional men. In conclusion, he had to thank those present for the toast they had received with so much cordiality.

Mr. WOODHOUSE proposed "The Visitors." He supposed, he said, that the old established custom of dining together in Northern Europe was a token of friendship, and, he took it, an amplification of the Eastern custom of taking salt together. They had been honoured by the presence there that night of many distinguished visitors. They had surgery and science well represented by gentlemen belonging to those departments, the ultimate aim of which was the same, namely, the relief of suffering humanity. He coupled with the toast the name of the Dean of Middlesex Hospital.

Mr. SIDNEY COUPLAND, in responding, said that the dental section of the profession had reason to be proud of a hospital with which

the honoured names of Tomes and Morgan were associated. They all knew the great debt humanity owed to the art and science of dentistry and the pain that it had relieved. Speaking as a physician, he said, they had done a great deal to lengthen the days of man. He knew for certain that they had deprived a great many people of the pernicious habit of taking drugs and consulting physicians, which, whether it shortened their days or not he would not like to say, but he had a shrewd suspicion the two went together. It was said that as civilization progressed, it was accompanied with the deterioration of the teeth. They heard that the race would become eudentlous, and that the people of the future would have to take their nutriment in some other way to what they did at present. He thought that prophecy would never be fulfilled, because so long as the Dental Hospital existed, and he believed it would go on until the end of time, he was certain men would never have to go eudentlous. He thanked the company on behalf of the visitors.

Mr. STORER BENNETT proposed the health of the Chairman, the calls upon whose time were, he said, so numerous and important that they were much indebted to him for consenting to take the chair at their Annual Dinner. They had, too, listened with pleasure to the words of praise Mr. Hulke had bestowed upon their hospital and school, which, as coming from the acknowledged leader of British surgery, were of special value. Although he came amongst them by no means as a stranger, it was, he believed, the first occasion upon which they had had the opportunity of welcoming him at their festive board. They all honoured Mr. Hulke for those qualities which enabled him to attain to so distinguished a position in his profession.

The CHAIRMAN having briefly replied, the proceedings terminated at about half-past eleven o'clock.

LIVERPOOL DENTAL HOSPITAL.

STUDENTS' DINNER.

THE Annual Students' Dinner in connection with this hospital took place on Saturday evening at the Adelphi Hotel, the company being a numerous one. The chair was occupied by Mr. E. J. M. Phillips, L.R.C.P., M.R.C.S., and L.D.S., and among those present were Mr. W. Mitchell Banks, M.R.C.S., Dr. Larkin, Dr. Permawan, F.R.C.S., Dr. Nesbit, Dr. Hamilton, Dr. Stanley Kellett-Smith,

Dr. Waite, Dean Edwards, Messrs, Royston, Mapplebeck, Rose, Bates, Osborn, and other members of the hospital staff, the lay members of the committee being represented by Messrs J. J. R. Scott, honorary treasurer; W. L. Jackson, honorary secretary; Charles Birchall, and G. Wynne. The toast list was short, being confined to "The Queen," "The Dental Hospital," proposed by Dr. Stanley Kellett-Smith, and responded to by Mr. Mapplebeck; "The Visitors," proposed by Mr. Snape, and replied to by Dr. Banks; and "The Chairman," proposed by Mr. Osborn. The music provided for the occasion was exceptionally good, the chief contributors being the students and their friends. In the course of the proceedings it was stated that the Liverpool Dental School is now becoming one of the foremost in the kingdom, and that when the extensions now in progress are completed the accommodation both for operations and mechanical work will greatly extend the usefulness of the hospital, which is already doing a great and invaluable work, and is taking rank as one of the most indispensable of our medical charities.

BIRMINGHAM DENTAL HOSPITAL.

THE Thirty-fourth Annual Meeting of the Birmingham Dental Hospital was held yesterday, at the Council House. The Mayor (Alderman Johnson) presided, and among those present were Dr. Short, Dr. Haynes, Councillor S. Lloyd, and Messrs. J. H. Chance, H. B. Neale, W. Thomas, J. M. Smith, J. A. Jones, A. E. Donegan, E. P. Naden, J. T. Hylder, F. Madin, F. H. Goffe, Allen Edwards, and W. A. Addinsell (hon. sec.). In their annual report the committee stated that the structural alterations referred to in the last report has been completed at a cost of nearly £500. and while the hospital appointments were in a higher state of efficiency than they have ever been, there were still many improvements which could not be long delayed, and for which funds were urgently needed. The accounts showed an adverse balance of £106 10s. 2d. The surgical committee reported that the dental staff had suffered the sad loss, by death, of its junior member, Mr. William Palethorpe; but it had been lately strengthened by the appointment of Messrs. F. H. Goffe and A. E. Donegan as honorary dental surgeons, and Messrs. J. E. Parrott and P. T. Naden, as honorary assistant dental surgeons. The operations for the year numbered 18,467 against 19,274 in the preceding year;

and the total number of attendances of patients was 9,447 as against 9,951. The mayor in moving that the reports and accounts be adopted said that though that was the first time he presided over their meeting, he as a member of the Council of Mason College and Queen's College knew something of the work of the Dental Hospital. It was quite clear that the two reasons which justified the foundation of any hospital applied to that institution. Hospitals were established, in the first place, for the relief of suffering, and, in the second place, for the promotion of medical and surgical knowledge. Possibly there was no ailment, apart from very serious illness, which caused so much suffering as resulted from diseases of the teeth. Mr. J. H. Chance (chairman of the committee) seconded the motion. He pointed out that, though the work of the hospital was increasing, the subscriptions hardly varied from year to year and never increased, he could not think how it was, when people knew how much suffering was caused by diseases of the teeth, that such an institution should be overlooked. Were it not for outside subscriptions and the Hospital Sunday and Hospital Saturday contributions they would be in a very bad way. There were many improvements in the hospital which they could carry out with advantage to the public if they had more money. On the motion of Mr. J. A. Jones, seconded by Mr. J. M. Smith, a vote of thanks was passed to the hospital staff for the zeal and ability with which they had performed their duties during the past year. Mr. Osborn proposed the election of the officers for the ensuing year as follows: President, the mayor; vice-president, Lord Calthorpe; hon. treasurer, Mr. J. W. Wilson; and hon. secretary, Mr. W. Arthur Addinsell. Mr. H. Breward Neale, in seconding the motion, said that there was reason to be pleased with the progress conserve dentistry was making in Birmingham. They wished to educate the public and the rising generation of dentists in the direction of preserving the natural teeth. A vote of thanks to the honorary staff and officers was proposed by Mr. F. W. Richards. Councillor S. Lloyd, in seconding the motion, remarked that those concerned in the management of the hospital were too modest. Its benefits were not sufficiently understood either by persons requiring its aid or by the general public. He himself had to make enquiries before he could enter himself as a subscriber. The meeting closed with a vote of thanks to the mayor, proposed by Mr. W. Thomas, and seconded by Dr. Horton.

ANNUAL DINNER OF THE NATIONAL DENTAL HOSPITAL

THE Annual Dinner of the Past and Present Students was held in the Venetian Saloon of the Holborn Restaurant, on the 8th ult. Professor Michael Foster, F.R.S., presided.

After the loyal toast, the Dean reported that during the past twelve months there had been a few changes amongst the Staff. Unfortunately we have to lament the loss of one of our number by death, Mr. Percy White, M.B., and Mr. W. R. Humby has resigned his appointment as Dental Surgeon. The vacancies have been filled by Mr. Glassington's appointment as Dental Surgeon, and the election of Messrs. Sibley Read and Edgar Beverley as Assistant Dental Surgeons. Mr. Ogle has also succeeded Mr. S. E. Pedley as Anæsthetist. He noticed their removal to the new building at the corner of Devonshire Street. The Dowager Lady Howard de Walden had not only helped to secure a capital site, but afterwards at her own expense, caused to be erected the present Hospital, to which he hoped they would soon remove. He was happy to be able to announce that His Royal Highness the Duke of York, has not only consented to come and open the Hospital early in next year, but has graciously signified his willingness to become President of the Institution. The Right Honourable the Earl of Stafford will act as Vice-President.

The Chairman then distributed the prizes and certificates for the past session as follows :

Rymer Gold Medal, Mr. T. C. Reece ; Ash Prize, Mr. T. C. Reece. *Dental Anatomy*—Certificate, Mr. R. R. Ward. *Dental Materia Medica*—Medal, Mr. R. S. Nicholls ; Certificate, Mr. H. W. Tice. *Dental Mechanics*—Medals, Mr. T. G. Jenkin, Mr. Norman Reeve ; Certificate, Mr. T. C. Reece. *Metallurgy*—Medal, Mr. Norman Reeve. *Dental Surgery*—Medals, Mr. H. J. Relph, Mr. T. C. Reece ; Certificates, Mr. S. F. Rose, Mr. T. G. Jenkin. *Histology*—Certificates, Mr. H. J. Relph, and Mr. S. F. Rose ; Students' Society Prize, Mr. R. E. Nicholls.

Prof. FOSTER in proposing "Success to the National Dental Hospital and College" alluded to the change which had taken place in the practice of Dental Surgery—a change of a political type ; for the old policy of treatment was "radical," whereas the present was distinctly "conservative." It seemed that now upon a mere fragment a tooth could be built up which might be a false tooth, but was not a treacherous one, and that extraction was considered a disgrace. He referred to his student days when perhaps the wrong tooth was taken out and nothing said about it. Then there was "the key," an instrument which appeared a cross between a boot-hook and a rat-trap ; when recalling his experiences, sad memories came over him. Now the armament of tools was very different, and various branches of science, such as chemistry and bacteriology, were brought into requisition. The dentist whose art was built up of such like sciences could no longer take a free plunge. No doubt it led to an expensive education and might raise a question—"Is the game worth the candle?" but it must be remembered that with an increase of ability came the increase of fees. The laws affecting the "struggle for existence" held good for dentistry also ; knowledge meant power ;

knowledge was potential energy, but wanted properly directing. After alluding to the work of the school, Professor Foster pointed out there was another aspect of the Hospital—that of Charity. In dealing with disease the first line of defence was to take care of the teeth and there was a great field for the dental profession. It was a matter of national importance and its claims were not sufficiently recognised.

Mr. PERCY EDGELOW responded on behalf of the Hospital, and Mr. SIDNEY SPOKES for the School.

Mr. S. J. HUTCHINSON proposed "The Past and Present Students," to which Mr. P. W. GREETHAM, and Mr. M. FARMER replied.

Dr. MAUGHAN proposed "The Visitors."

Sir JAMES CRICHTON-BROWNE in returning thanks said he was under the impression that the subject, as to the value of teeth in the expression of the emotions, had not yet been properly worked out. So far as he was concerned his teeth were at that moment expressive of gratitude for the hospitality shown to the visitors.

Mr. F. CANTON also replied.

Mr. GEORGE CUNNINGHAM having proposed the health of the Chairman, Prof. FOSTER briefly replied.

CORRESPONDENCE.

[We do not hold ourselves responsible in any way for the opinions expressed by our correspondents]

DENTAL ADVERTISING.

To the Editor of the "DENTAL RECORD."

SIR,—The resolution moved by Mr. Brudenell Carter and seconded by Sir Dyce Duckworth, at the General Medical Council Meeting on December 5th, reported in the *Lancet*, of December 9th, which doubtless you will insert for the information of your readers, places the power of the Council beyond cavil or dispute. This resolution was moved as a warning. In May it will in all probability become a regulation of the Council, and will be acted upon. It is important that this should be known, especially by those who desire "the privileges of a profession, combined with the freedom of a trade."

No doubt those who get their living by advertising, and who do not depend upon the quality of their work, and their scientific and professional education and knowledge, to recommend them, will squirm under this limitation of their disgraceful practices—I hope they will—and I hope they will leave such a profession as ours in disgust, and take to some business where there will be less restraint, and where they can exhibit their signs and horrible pictures with impunity.

I am Sir, yours truly,

HENRY BLANDY.

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YET ANOTHER PROFESSIONAL HOLIDAY.

The World's Columbian Dental Congress.

BY GEORGE CUNNINGHAM.

(Continued from page 14.)

No Congress, be it of the classes or of the masses, be it in the far, far East, or in the wild and woody West, is complete without a feast; a kind of materialisation, I take it, of the proverbial, if occult, feast of reason and flow of soul, which such gatherings provide to satisfy the intellectual cravings of the inner man.

In this case, it was precipitated, in the form of a banquet, at the Chicago Beach Hotel, on the eve of the closing session, and some two hundred and fifty members, including a number of ladies, "processed" from the reception room to the elegant and spacious banquetting hall, to the strains of orchestral music. The artistic menu card bore the happy title, "Dinner Given by the American Members of the World's Columbian Dental Congress to their Friends from Abroad," and in the centre was a portrait of Columbus, draped with the stars and stripes, with his old historic ship, the *Santa Maria* in the distance, and three sea-gulls, indicative, I was told, of land. But someone somewhat maliciously whispered, "Aye, England! because there are only three of you here, while Spain has sent us fifteen." I protested his interpretation must be wrong, since we were five, "No, no, only three here, the other fowls have flitted to the fair, are probably lost in the Midway Pleasance, and consequently could not be set down on the '*K'rect Card*'! Well, anyway, there a'int *no flies*' on you three!" A not very euphonious

expression, but conveying, I presume, no small compliment, and a rather obvious effort to maintain the analogy of the birds, hence the response, that we were not to be "gulled" by fulsome compliment.

Dr. Swasey, of Chicago, the portly, yet active Chairman of the Committee or Reception, presided, and in more senses than one, adequately filled the Chair. The "friends from abroad," representing some twenty-seven different nations or countries, were mostly at the high table, with the President of the Congress on the right, and the representative of Great Britain on the left of the Chair. After doing ample justice to the menu, the wine, and, I trust, the wit and humour of our pleasant table companions, and, as the fragrant fumes ascended, denoting a general worship at the shrine of our sweet Lady Nicotine, our rapt attention was excited by the stentorian tones of the Chairman. Happily, in the United States the absence of any conventional toasts is not regarded as incompatible with either loyal sentiments towards the powers that be or patriotic feelings towards one's own country. His address was, therefore, direct, appropriate, and succinct. After alluding to the Congress as one which would soon only live in memory and history; as one of the greatest meetings ever held by the dental profession; as one affecting dental education in every land where dentistry is known, from its valuable additions to dental science; he paid eloquent tribute to the President, the Executive Committee, especially the Chairman and the Secretary thereof, and above all, the Secretary-General, for their diligent three years' work, which had produced so grand a meeting. He made a brief but telling allusion to the milk of human kindness, which had purified professional jealousy, and concluded with a hearty expression of gratitude on the part of American dentists to the foreign members, who had so nobly responded, both in person and by pen. extending to them the right hand of fellowship and good wishes for their safe return to the homes of their birth or adoption. Need it be said, that his short, but able speech, was rendered trebly eloquent by its unmistakable ring of sincerity, and the vociferous applause with which it was profusely punctuated.

When the storm of applause, evoked by this speech, had subsided, the Chairman announced that there was to be no formal toast list, but only a kind of friendly convivial go-as-you-please competition; anyone called upon might make a speech on any subject he pleased, bar one, and that was dentistry; he might sing a song, tell a

story, or stand on his head and look pleasant. As was to be expected, such an announcement provoked considerable amusement. Then, armed with empty bottle in place of gavel, our Chairman and Toast-master,

“Rapt with zeal, pathetic, bold and strong,
Roll’d the full tide of eloquence along.”

Hereupon the President of the Congress rose, meeting with the hilarious reception he had so well deserved, but his singing days being over, having no desire for repute as a story teller, and having passed the age of terpsichorean or acrobatic exploits, he wisely did not forget his dignified position, and made a graceful, eloquent address to his audience, as occupying, one and all, an equal place, with equal rights, on the same broad platform of legal dental practice on ethical principles, entirely regardless of race, nationality or sex. After calling attention to the active support and presence of the entire dental profession of Chicago to a man, he dwelt on the truly International character of this Congress of dentists, and indulged in, he trusted, the not vain hope, that some of them would live to see the day, when a diploma, from the respectable educational institutions of our respective countries, would be regarded as a professional passport from one’s government, securing its possessor equal rights in any country where he might locate in order to devote himself to the support of himself and his family and to the good of humanity. Then, indeed, would exist a true brotherhood of science, a real brotherhood in art, an incontestable professional brotherhood such as we dare not now try to realise. The inspiring thought of an International diploma was worthy the occasion, was tumultuously received and evidently struck a sympathetic cord, which vibrated that whole long night.

Dr. ERIC RICHTER, in replying for Germany, endorsed the sentiments of the President, and asserted that the only way of achieving such a consummation, devoutly to be wished, was by this becoming the forerunner of many similar gatherings.

La Belle France, proud mother of the first International Dental Congress, roused our enthusiasm in the person of Monsieur Charles Godon, of Paris, and in the language of all others, the most telling, that of his country. He advocated the formation of a standing committee of organisation to promote these International Congresses, and suggested other countries might well follow the example of

France, where such a committee had been formed. He ended by saying that his countrymen looked forward to entertaining them at a similar banquet in 1900. *Vive Paris! Vive la France!*

Like several of the subsequent speakers, M. Godon not only represented the dental societies of his country, but was also the official delegate of the Government. We sadly missed his *confrère* Monsieur Rounet, who had come all these weary miles only to be struck down by serious illness on reaching the goal of his desires. Poor friend Rounet may be remembered as having attended the Brighton British Dental Association Meeting, where he distinguished himself by the rapidity with which he acquired English on the Kindergarten principle adapted to adults: *e.g.* you learn the name of, well, say a drink, and then you have it; "Gin and ginger beer," is said to have been his first lesson, but, when he had mastered his lesson and was presented with it in a large soda-water tumbler he complained to his smiling colleagues in French, that he had ordered a drink, not a bath. His linguistic reputation must have spread far, if we may judge from the following item in the daily edition of the *Dental Tribune*.

"Although Dr. Rounet only arrived forty-eight hours ago from Paris, he has already acquired a fair knowledge of English. Here is the way he says "God save the Queen," "Gotsaveteken."

Rumour hath it that he had never taken any lessons since, but had come to Chicago expressly to renew them, with a view to replying in English at the banquet. His former professor, aye, and many others, were disconsolate that all their hopes were frustrated, and that that merry meeting at the Club, on the night of arrival, was so quickly followed by such thorough ill-health that he had to renounce his tour of the American Dental Schools, and to return home.

"Let Hercules himself do what he may,

The cat will mew, and the dog will have his day."

And so it came to my turn to amuse as best I could. I endeavoured in a pictorial speech to demonstrate, that dental meetings have other very useful aspects, besides the promotion of science, the promotion of good fellowship and excellent opportunities of having a high old time like the present. By means of a projection lantern, some snap-shots of social groups, such as Professor Miller in his "studio," Silvester and the Kaiser's understudy, and others, taken at the Berlin Medical Congress, enabled me to urge the duty,

not to say the pleasure, of participating in all the International Medical Congresses; another series of slides, portraying some of the faces and incidents of professional life to be encountered at the meetings of our national association and its branches, gave me an opportunity of assuring our friends, from the other side, that a cordial reception awaited them, and of pointing out, that smaller gatherings like these enabled us to show even more personal attention, than mammoth gathering like an International Congress.

A few other slides illustrative of groups at this Congress, brought my remarks quite up to date, and formed somewhat felicitous pegs, on which to hang some expression of the obligations, my colleagues and myself, felt under to many of those present. The last one showed the Secretary-General of the Congress at home with his wife and family. As "Arriet" said of Kiralfy's Constantinople, "it took the *caique*."

I had been very nervous and apprehensive about the success of a somewhat rash venture. After darkness cometh light. This is what the *Dental Review* said about it:—"Dr. Cunningham was warmly applauded for his very entertaining and exceedingly humorous lantern lecture. It was one that will long be remembered, and was a pleasing diversion for the members."

Denmark, Spain, Italy, Greece, Austria, Holland, Canada, Switzerland, Russia, Uruguay, Paraguay, Colombia, the Sandwich Islands, and the Phillipine Islands, all found eloquent representatives, sometimes in their own language, sometimes in English; Americans abroad provided good speakers in Drs. Mitchell and Rathbun, and the ladies, a happy little speech in French, from Madame Caracatsanis, of Athens; while little Wales, through Mr. Clarke, longed for an opportunity to reciprocate all the kindness and hospitality shown him. It was a great speech night, unique, polyglot, and vastly entertaining. But even moments, winged with pleasure, must have an end, so the Secretary-General briefly gave us the orthodox closing toast, the Chair; we drank it with musical honours and hearty cheers; he replied; everybody sang "Auld Lang Syne," and then the lights went out. Vale! Ae man, but it was a grand night.

Up late o' nights did not prevent a large proportion of members, and certainly not the officials, from being at their post. The attendance at the closing session, especially considering the inevitable strain of a very busy week and the counter attractions of

the World's Fair, was not only surprising but unprecedented. The proceedings were nearly as interesting, and the enthusiasm as marked as at the opening ceremony.

A number of reports of the committees, such as those on the History of Dental Legislation and on the Care of the Teeth of the Poor, were read by title only, and will appear in the "Transactions of the Congress." Several papers were treated in a similar way, but mainly from contributors *in absentia*.

It cannot be said that the topic for discussion: "What Relation shall Dentistry hold to Medicine?" was adequate to the importance of the subject, mainly, I think, from the absence of anyone specially appointed to open the debate. It certainly is an excellent plan to have a previously prepared list of topics for discussion, but some equally prepared "opener" and, when possible, "opposer" should also be on hand, otherwise what might have been a valuable debate is apt to degenerate into little more or less than an expression of opinions, interesting it may be, but lacking force and sequence.

In this instance, Dr. Patterson, Kansas City, thought that the cause of dentistry would not be hastened by such discussions, and that the most rapid progress had been made by dentists as an independent profession. Dr. Crawford, Nashville, argued in favour of associated work by having a well equipped section in dental and oral surgery in every medical organisation in the country. Dr. Fletcher, St. Louis, was of opinion, that dentistry should be taught in institutions conducted for that alone, as attending the lectures and instructions in a medical college did not afford the proper opportunities from the medical students receiving first and undue consideration. The subject was then passed.

Then came my *quart d'heur de Rabelais*, yet none the less one never to be forgotten by me. The report of the Committee on Prize Essays was then read, in which it was announced, that I had been awarded the medal for the best essay on Oral Hygiene. The President of the Congress made a graceful speech which, specially touched me by his kindly reminiscence of our former relations, he as my professor and I as his student long years ago at Harvard. As he pinned the medal on my coat, he trusted that I would not only be proud of it but wear it at every dental meeting which I attended. That brought a smile at the thought of what some of my friends at home would think, aye, and some of them say, were I to obey his behest. I think that he understood that smile: I hope so.

The medal is certainly a very pretty one, consisting of a gold bar or clasp from which is suspended an elaborately worked octagon-shaped medal with a laurel wreath in the centre, executed in three different shades of gold, and suitably engraved.

I must confess that I was more affected by the overwhelming warmth with which the award was received by that great audience, than by the award itself. I simply bowed my acknowledgement to President and audience, and took my seat. The applause still continuing, the President announced that it had been arranged that no speech was expected from me on this occasion, but if they insisted—and insist they did. What I said I scarcely know, nor does it matter now; I trust my audience realised that I felt full appreciation of the award and their reception of it. I must also express my gratification to the many friends both at home and abroad for their many and hearty congratulations.

I sincerely trust these allusions to this event will not be regarded as entirely egotistical, as, through no fault of mine, the situation was something more than a mere personal one. If justification is needed, it is to be found in the concluding sentence of the editorial article in the *Dental Cosmos*, on "The Lessons of the Congress." "The awarding of the prize essay medal to Mr. George Cunningham, of Cambridge, England, was, in this regard (viz.: a better understanding by those abroad 'of the motives of cordial good-will and *esprit de corps* animating the organization,' and the absence 'of any feeling of resentment on the part of American dentists, created by their misunderstanding of the attitude of some of their foreign *confères*') a source of much gratification to those interested, not alone because of the exceptionally high character of his essay, but because it was in some sense a tribute animated by the fraternal regard entertained for the profession of England, despite individual differences of opinion, and gave additional emphasis to the impersonal, universal spirit of the Congress."

Monsieur GODON then submitted a resolution, supported by the signatures of some fifty foreign members, to the effect, that under similar circumstances another International Dental Congress should be organised, which was adopted unanimously. He also, on behalf of the foreign representatives, expressed their thanks to the different officials of the Congress for the many courtesies received, and their appreciation of the excellent manner in which their duties had been fulfilled.

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Dr. TAFT, in the absence of the Chairman of the Executive Committee, returned thanks, and expressed their gratification at having achieved a grand and undisputed success.

The PRESIDENT then delivered a valedictory address, ably epitomising the most prominent features of its conduct and its progress. With the hope that in the future an exigency like the present should be the motive for the formation of another World's Dental Congress, he formally declared this World's Dental Congress adjourned *sine die*.

On leaving the hall, each foreign member was presented with a very handsome and massive bronze commemorative medal. We were also invited by the President of the Congress to accompany him and his friends to the Great World's Fair, where an excellent luncheon was served. Ample justice was done to his generous hospitality, full expression of our gratitude followed, and then we parted to visit the wondrous White City. And so ended the grandest combined effort our profession has ever yet made. Did I say "ended"? Not so, for the full import of its success will not be realised until its Transactions appear, and the value of its work will affect dental education, dental science, dental progress for all time.

(*To be continued.*)

*CROWNS.

By Mr. J. T. HANKEY, L.D.S.Eng.

MR. PRESIDENT AND GENTLEMEN,—

It is my privilege this evening to read a paper upon a subject, with which very few, at the present day, are not familiar, modern dentistry has made rapid strides to the fore, but no branch of our profession has, I venture to say, come more forcibly to the front, than the application of artificial crowns to healthy roots, and the restoration of articulation and appearance.

As the time at my disposal is limited, I shall not dwell upon the various methods of rendering unhealthy roots aseptic, but shall, in each case, assume that we are operating upon a healthy one, or one that has been rendered healthy by previous treatment.

* A Paper read before the Students' Society of the Dental Hospital of London.

As a preparatory step, it is well to discuss: When is a root suitable for crowning, and when is it not? Many of the failures, that we come across, may be justly attributed to a little too much zeal upon the part of the operator to crown a root, which upon second thoughts, he would have extracted. Dr. Evans writes as follows: "There are many teeth and roots which cannot be rendered suitable for crown-work.

"1. Roots which are permeated and softened by decay.

"2. Roots exposed or loosened from the absorption of the gums and alveoli; or affected with irremediable disease of the investing membrane.

"3. Cases in which abscess with necrosis has extensively impaired the walls of the alveoli."

The suitable cases are too numerous to mention, but if when deciding between crowning and extraction, Dr. Evans' classification be borne in mind, it will be easy to determine when to crown and when not to do so.

At a first glance, a person, reading one of the standard works upon the subject, is naturally bewildered with the number and variety of crowns, but upon a closer examination it will be observed that they may be divided into two classes.

Class I. Crowns without collars.

Class II. Crowns with collars.

Class II. may be again divided into:—

(a) All gold crowns.

(b) Gold crowns faced with porcelain.

My time being limited, I shall confine myself to a description of the more important and commonly used crowns, rather than to the more fanciful and artistic dentary appendages. I will therefore pass without any further introduction to Class I., Crowns without collars usually known as pivots, are most commonly used for the six incisors, sometimes for the first and second premolars.

The various stages in the construction of a pivot are:—

1. Preparation and shaping of the root.
2. Enlarging the root canal.
3. Fitting pin and burnishing foil to root.
4. Soldering the foil to pin.
5. Fitting porcelain front.
6. Investing and soldering.
7. Fixing.

Assuming the root is in a healthy condition, the method of preparation is as follows:—

The root should be exposed previous to the operation, by pressing the gum away with gutta-percha, thus greatly assisting the operator, by preventing unnecessary laceration and bleeding of the gum, which so often attends the shaping of the roots.

Operators have generally agreed, that it is better to cut the root roof-shaped, with the slanting surfaces towards the labial and palatal aspects, respectively; the labial slope should be longer than the palatal, and should also be cut a slight distance under the gum line, so that no joint is seen between the root and the artificial tooth, when fixed.

The advantages claimed for this method of shaping the root, over the old style of cutting it quite flat, are, that more tooth substance is saved, thus allowing for a longer pin, also the pivot when fixed cannot possibly rotate.

Individual operators have their own ideas upon the instruments that should be used for shaping. I have found the large coarse cut wheel burs most advantageous, finishing off when reaching the gum line with a fine cut inlay wheel bur. Small corundum stones having the same diameter as the surface of the root, and used with the flat surface towards the root, answer the same purpose, though they do not cut so rapidly. Should the root be decayed or broken down below the gum edge on either the mesial, distal or palatal aspect, this portion may be built up with amalgam, obtaining an undercut in the sound tissue.

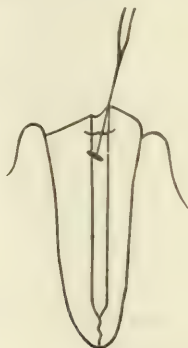


FIG. 1.

Attention must now be given to the direction and position of the nerve canal. If, as often occurs, the opening is so directed

towards the labial aspect as to interfere with the fitting of the tooth the canal must be enlarged backwards, this is effected with fissure burs or with drills of various forms. A spear pointed or a spiral drill will be found most efficacious. In enlarging the canal, its direction should always be borne in mind, for the slightest deviation might lead to perforation of the walls, and thus cause trouble and perhaps loss of the root.

The canal walls should then be roughened, as shown in Fig. 1, preferably with a wheel bur, to afford additional hold to the cement used for fixing.

A gold wire, as stout as possible, should now be accurately fitted as far up the root as possible, tapering the end, so that it will fit snugly up to the apex; at the point where it emerges from the canal, a slight groove should be cut round the pin, a piece of thin 22-carat gold plate or preferably platinum foil slightly larger than the root from before-backwards, is next selected, and an opening punched a size smaller than the diameter of the pin, the foil is then slipped over the pin and burnished to the root, the pin can now be withdrawn and the foil will come away with it, being held in position by the groove which was cut in it. A piece of No. 00 gold solder is now placed on the joint and the pin and foil are firmly soldered together. It is then again placed in position and the foil well burnished and trimmed to the root and over the palatal edge, where you will remember the root was left purposely high. It will be found to fit more accurately and easier of adaptation if it is snipped on this palatal aspect with a fine pair of scissors, as shown in Fig. 2.

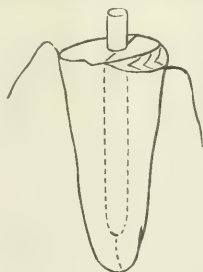


FIG. 2

This method, recommended by Mr. Hern, forms a partial collar, and also tends to prevent any outward movement to the pivot. The pin should then be cut off to within one-eighth inch of the outer surface of the foil.

A flat plate tooth of suitable size and colour is then backed with

22-carat gold or thin platinum and is fitted to the root ; if the pin interferes with the fitting it should be bent back, also a notch may be cut in the tooth where it touches the pin, this trouble can be avoided by using a thin tooth, now manufactured by Messrs. Ash and Sons specially for crowns. The tooth should then be firmly attached to the plate with hard wax, and attention directed towards the bite. Previous to waxing, the napkin should be placed in the mouth and all parts thoroughly dried, thus obviating the difficulty which is sometimes experienced at this stage by the parts becoming wet. It must now be invested in plaster and pumice, gently heated up and soldered with No. 1 solder, care being taken to fill up all the crevices, to flush plenty of solder on the part which was burnished over the palatal surface, and to build up the tooth to represent nature as near as possible. It should then be allowed to cool, and filed up and polished in the ordinary way.

Previous to insertion the pin should be barbed with a sharp graver. For fixing, osteo, mastic or gutta-percha may be used. If with osteo the root should be thoroughly dried, and well filled with very moist osteo, the pin should then be well covered, and the pivot pressed home, being held in position until the cement sets, the surplus osteo should then be carefully trimmed away.

I will now pass on to Class II., Crowns with collars.

Shaping the Root.—In the process of shaping the root for a perfect fitting collar, it is well to bear in mind the shape of a normal root at the gum edge. For this purpose I have appended a small diagram (Fig. 3) which will illustrate it far more accurately than I can describe.

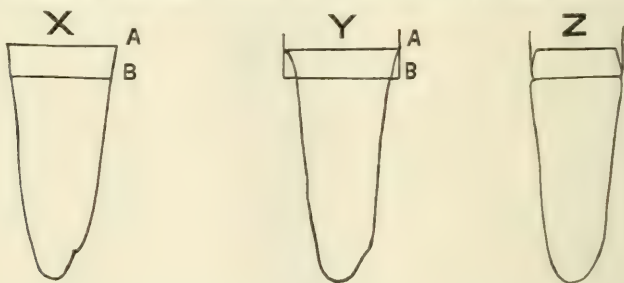


FIG. 3.

It will be seen that the root at the gum edge A (Fig. 4), X is of far greater diameter than below the gum at B, it is therefore obvious that if we fit a collar to a root in its normal state we shall have a condition of things as illustrated in section at (Fig. 4) Y. Our object

in shaping a root then must be to get rid of this flange and have in its place a cone-shaped root (Fig. 4) Z, this enables the collar when soldered to become tighter the farther it is driven up the root.

For shaping, a variety of instruments are used, corundum stones of various shapes and sizes are preferred by some, while others pin their faith to scalers of various forms and patterns too numerous to mention. Of the many scalers suggested, I think Dr. Mitchell's heavy scaler is the most useful.

In using this instrument, the method of procedure is as follows, having previously locally anæsthetised the gum by passing up crystals of cocaine, between the root and the contiguous membrane, the scaler is inserted gently beneath the gum, and the edges are pared all round by withdrawing the scaler with the cutting edge tightly pressed against the overhanging edge. A sharp fine cut fissure bur in the dental engine should then be passed all round the root, to remove any little rough points which may be left. If these directions be attended to, with a little practice a root may be speedily and easily trimmed, and very little hæmorrhage will ensue. If the root is very badly decayed below the gum, this may be remedied by building up that portion with amalgam, trimming it cone-shaped while it is still soft.

The size of the root should then be taken. This may be accomplished by passing a loop of thin binding wire round and twisting it up until it is quite tight with a little instrument I have suggested, and illustrated below. Fig. 4.

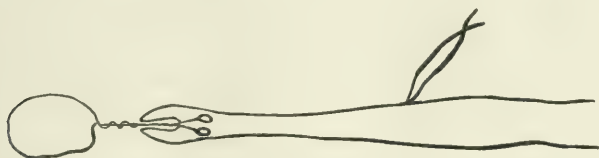


FIG. 4.

It will be found far more useful and less clumsy than a pair of pliers which is generally used for this purpose. It consists of a straight steel rod flattened at the end, with two small holes drilled in the point, and a small button on the hand'e. The wire is passed through the two holes and pulled through until a loop corresponding in size to the root is attained, it is then slipped into the groove between two flanges of steel, this acts as a director, the two loose ends are then wound round the button, the loop is then placed round the root and the instrument is hoisted until the wire is quite tight.

The wire is now snipped at the join and we have the exact size of the collar. A piece of 22-carat gold plate, No. 4 (Ash's) gauge, of suitable width is then cut, a trifle shorter than the wire, annealed and roughly bent to the shape of the root, the edges are then brought together having been previously bevelled as shown diagrammatically below, so that when (Fig. 5) soldered there will be a perfectly level

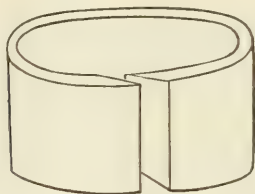


FIG. 5.

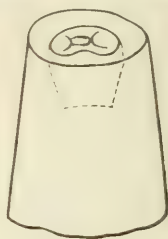


FIG. 6.

joint, the parts are then cleaned with acid, washed, boraxed, and soldered with No. 00 gold solder.

With regard to the position of the joint, I think it is better to arrange for it to come where it will least interfere with any after soldering, and this is in a porcelain crown generally towards the palatal side.

The collar should next be scalloped out where it will pass between the teeth, this is to allow for the alveolar ridge, which is, as you are aware, much higher between the teeth than on the labial and palatal aspects, then bevel the edge all round from without inwards. Having applied cocaine as before, the collar should be placed round the root and pressed or malletted well home, it should then be removed and with a pair of contouring pliers, contoured up to touch the contiguous teeth, to prevent food from packing in between. Now trim off the biting edge perfectly level, and again apply the collar to the root, a piece of soft stent should be pressed into the collar and the patient requested to close the teeth. The collar should then be removed and the stent trimmed to represent cusps. The crown is then invested with stent to the upper edge of the gold all round, as illustrated in Fig. 6. A metal cast of this is taken either in zinc or Mellotte's metal, and a cap is struck up by laying a piece of No. 4 (G) plate upon a block of lead and hammering the die into it. The cap must now be solidly filled up with No. 1 solder and the collar cut down a portion corresponding to the gauge of the plate used for the cap, they are next soldered together ;

this is accomplished by placing the the collar upon the cap, in position, carefully boraxing the edges all round, and holding them with a pair of fine tweezers over the Bunsen flame until the solder in the cap melts, and joins the two together. The surplus gold may next be trimmed off and the crown filed up and polished in the ordinary way, to prevent the crown from crushing during the polishing, it is as well to fill it up with stent. We have now an all gold crown.

If it is desirable to face the crown with porcelain, a tooth of suitable shade and a little longer and wider than the gold crown should be selected. The under slope indicated at G, must be ground perfectly level by placing it against a corundum stone. The tooth

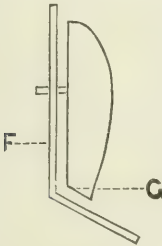


FIG. 7.

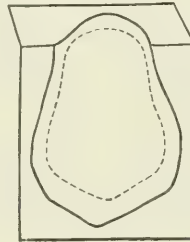


FIG. 8.

should then be backed with pure gold, No. 4 guage, allowing the backing to project out on all sides. The pins should not be bent, but allowed to stand out perfectly straight in order that the backing may be pulled on or off easily, the tooth and backing will appear in section as Fig. 7, and from a front view, as Fig. 8. With a fine fret saw a portion of the gold crown must be cut away on the buccal aspect similar in shape to the backing F, (this I have illustrated in

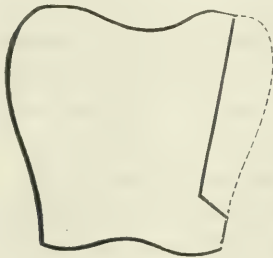


FIG. 9.

Fig. 9), cutting it away in front so that when fixed, the join between the tooth and the gold will come just beneath the gum line. Now

carefully fit the backing to the slot and arrange that the tooth when fitted will overlap the crown on either side, as the dotted line in Fig 10. The parts must then be held tightly in position and with a sharp instrument working outside the collar, the place should be marked on the backing where the collar apposes it. Now remove the tooth and bind the collar and backing together in position with binding wire, borax the joints and solder with No. 2 solder. It is not necessary to invest in plaster and pumice, the excess of gold should now be removed with a sharp pair of shears, finally adjust the tooth to the crown ; and with a fine pointed pair of pliers the pins must be bent down tight against the backing by passing one blade of the pliers inside and one outside the crown as indicated at Fig. 10.



FIG. 10.

With corundum stones in the dental engine, the porcelain tooth must be shaped up, cutting it down flush with the gold wherever it meets it, using Arkansas stones lastly to produce a smoother surface, finishing off with pumice and whitening on the lathe.

To fix the crown, the best method is to cement a T-shaped pin in the root with either osteo or amalgam before adjusting the crown, then fill the crown with osteo and drive it well home ; a good plan is to place about three thicknesses of napkin between the crown and the opposing teeth and press the jaws closely together. When the osteo has set, trim away the surplus as before, using great precaution to remove every particle.

The advantages of this method are :—

1. That it is quicker, there being no investment required.
2. There is no possibility of cracking the tooth.
3. By bringing the back down under the tooth, all fear of leakage occurring at the joint between the collar and porcelain is avoided.

THE LOGAN COLLAR CROWN.

There are various methods of making this crown, but I will describe to you what appears to me to be the most simple, as suggested some time ago by Mr. Northcroft.

A gold collar is fitted accurately to the root, as described before, while the collar is still in position, it is ground flush with the surface of the root with a corundum wheel, a gold roof is then fitted and soldered to the collar, and a hole punched over the orifice of the canal, corresponding in shape to the Logan pin.

The Logan crown is then fitted to the cap by the aid of corundum or diamond wheels upon the dental engine.

Having accomplished this, the next step is to fill up the recess on the under surface of the crown by packing with cohesive gold, old scraps of waste gold are very useful for this purpose.

The pin of the crown and the cap are then firmly attached with strong wax, and again placed in position while the wax is warm, any necessary alteration may then be made, the tooth and cap are then removed together and invested in pumice and plaster, the investment should cover the whole of the outer surface of the crown and collar, so that only the pin and the under surface of the cap remain to view.

The investment should be very gradually heated to a red heat and soldered with No. 3 solder, flowing it into the space between the plate and the pin, using a small pointed flame for this purpose. This done, the investment is allowed to cool very gradually, is removed and any over hanging edge of porcelain, cut down with corundum wheels, and the whole is polished.

In concluding, I must thank Mr. Dobbs for his excellent sketches, I must also thank you gentlemen, for your kind attention to what has been I fear, a long and tedious discourse, and I hope I am not requesting too much from you, when I ask for a hearty discussion.

REPORT OF SOCIETIES.

THE ODONTOLOGICAL SOCIETY OF GREAT BRITAIN.

THE ANNUAL GENERAL MEETING was held on the 8th ult., at 40, Leicester Square, the President, Mr. A. BOWMAN MACLEOD, in the Chair.

The minutes of the previous meeting were read and confirmed.

The ballot was then opened for the election of officers for the ensuing year, Messrs. Greenfield and Ackery being appointed scrutineers.

The officers and councillors elected were as follows :—

President.—Frederick Canton ; *Vice-Presidents*.—(Resident) R. H. Woodhouse, Ashley Gibbings, A. W. Barrett ; (Non-resident) F. H. Balkwill (Plymouth), W. E. Harding (Shrewsbury), George Henry (Hastings) ; *Treasurer*.—S. J. Hutchinson ; *Librarian*.—W. A. Maggs ; *Curator*.—Storer Bennett ; *Editor of Transactions*.—E. Lloyd Williams ; *Honorary Secretaries*.—Cornelius Robbins (Council), J. F. Colyer (Society), Clayton Woodhouse (for Foreign Correspondence) ; *Councillors*.—(Resident), John Ackery, Arthur Underwood, Harry Rose, C. D. Davis, C. E. Truman, W. R. Humby, W. B. Paterson, Harry Baldwin, John Gartley ; (Non-resident), H. C. Quinby (Liverpool), D. W. Amooore (St. Leonards), Wilson Hogue (Bournemouth), G. G. Champion (Manchester), J. McKno Ackland (Exeter), J. H. McCall (Leicester), T. Arkovy (Budapest), A. W. W. Baker (Dublin), F. E. Huxley (Birmingham).

The following gentlemen were nominated for Membership :—Messrs. Leslie G. Austen, L.D.S.Eng. (Crouch End, N.) ; Leonard Brown, L.D.S.Eng. (Clerkenwell, E.C.) ; John Robert Freeman, L.D.S.Eng. (Brockley) ; E. C. J. Hall, L.D.S.Eng. (Orchard Street, W.) ; L. Trevor Hankey, L.D.S.Eng. (Stoke Newington) ; Philip Harrison, L.D.S.Eng. (Finsbury Pavement, E.C.) ; A. W. Henley, L.D.S.Eng. (Victoria Street, S.W.) ; W. J. May, L.D.S.Eng. (Dental Hospital of London) ; W. F. Mellersh, L.D.S.Eng. (East Finchley, N.) ; Frank Morley, L.D.S.Eng. (Albemarle Street, W.) ; H. L. Pillin, L.D.S.Eng. (George Street, W.) ; W. B. Sansom, L.D.S.Eng. D.M.D.Harv., (Harley Street, W.) ; J. Sefton Sewill, L.R.C.P.Lond., M.R.C.S.Eng. (Wimpole Street, W.) ; for Non-resident Membership :—Messrs. Harold E. Bullen, L.D.S.Glas. (Truro) ; E. V. Coles, L.D.S.Eng. (Uxbridge) ; Arthur Curle, L.D.S.Eng. (Leamington) ; A. J. G. Evans, L.D.S.Eng. (Newport, Mon.) ; Hedley H. Ham, L.D.S.Eng. (Torquay) ; Frederick Haynes, L.D.S.Eng. (Rugby) ; Vacey Limington Hope, L.D.S.Eng. (Wellingborough) ; C. S. Hall, L.D.S.Glas. (Northampton) ; P. T. Leigh, L.D.S.Eng. and Glas. (Leeds) ; E. A. Manton, L.D.S.Eng. (Boulogne) ; C. H. Oram, L.D.S.Eng. (Cheltenham) ; W. Armston Vice, C.M.Aber., L.D.S.Edin., D.D.S.Phil. (Leicester) ; R. E. Woodcock, L.D.S.Eng., (Pontefract, Yorkshire).

The PRESIDENT said that he regretted to have to announce that they had to record the death of two members since the previous meeting, Mr. Alfred Alabone, L.D.S.Eng., of Newport, Isle of Wight, and Mr. Robert Reid, L.D.S.Eng., of Edinburgh. The latter gentleman had been a member of their Society for twenty-four years, and had attained the age of eighty-six ; he was well known as a dental practitioner in Edinburgh.

Mr. S. J. HUTCHINSON (the Treasurer), presented the annual balance sheet and statement of accounts, commenting in detail upon the various items. The accounts showed a good surplus, and had been duly verified not only by the auditors appointed by the Society but also by professional accountants.

Mr. ASHLEY GIBBINGS (the Librarian) in the course of his report, stated that he had taken stock of the books in the library, and regretted to say that while the books were in good order several of them were missing. Some had not been returned for many years but others he thought must be in the possession of members. He proposed to publish a list of the missing books in the next number of the "Transactions," and would be glad if members would do what they could to aid in their recovery. After carefully considering the question of the use of the library and the borrowing of books, the Council had decided to appoint a sub-librarian, who would be in attendance for two hours on three evenings in the week. The Council had also found it necessary to restrict the loan of books to the members of the Society, but students would, in common with other visitors, be admitted to the library on the presentation of a member's card.

Mr. STORER BENNETT (the Curator) said that he would not inflict upon the members a detailed description of the various specimens presented during the year as they had been fully described at the time of presentation. The Council had arranged that a sub-curator should be appointed to the museum, who would attend for two hours on three evenings of the week, a plan which he hoped would increase the usefulness of the museum and tend to make its riches more widely known and taken advantage of. He should state that the Council had also provided a microscope for the use of those visiting the museum, an addition to its equipment which no doubt would be fully appreciated. He would only add that the Council, and he personally, would be glad to receive any suggestions from members, either with regard to the usefulness of the specimens or

the suitability of the arrangement with reference to the proposed sub-curator.

He had to acknowledge the receipt of a model, presented by Mr. E. Lloyd-Williams that evening, of an interesting case, probably exostosis of the palate, which had been in existence for many years. The patient, forty-five years of age, had known of the enlarged condition of the palate for five and twenty years. Mr. Andrew Wilson had also presented a model showing what he called "conoid enlargement of a right lower temporary molar."

Mr. CORNELIUS ROBBINS described an arrangement which he had found useful. For years he had used Stoke's drip-point on the engine, but there were places in the mouth which one could not reach comfortably with it, neither could it be used for both right and left side without changing the bend of the drip-point. By his contrivance these difficulties were overcome.

The PRESIDENT then called upon Mr. Mummery.

Mr. J. HOWARD MUMMERY said that some attention had been drawn to the investigations of Dr. Vicentini, of Italy, on the cryptogamic flora of the mouth. He had been requested to describe those investigations and the theories Dr. Vicentini had founded upon them, in the form of a Casual Communication. He felt some difficulty in doing so owing to the absence of any translation from the Italian, a fact which had compelled him to rely upon the author's summaries and letters, and the Italian description of the plates. Dr. Vicentini's investigations were published in three papers communicated to the Royal Medico-Chirurgical Academy of Naples, between the years 1890 and 1893, and the question raised was one of considerable interest, though he doubted if many would be prepared to follow Dr. Vicentini in his deductions. The author claimed to have discovered a new form of micro-organism in the mouth, which he called "*Leptothrix Racemosa*," and went so far as to say that the other pathogenetic bacteria of the mouth are but derivations of this micro-organism. In view of the misconception as to the real significance of the term *Leptothrix* which existed, Mr. Mummery proposed first to give a short description of what is now understood by the term. In their work on dental caries published in 1867, Messrs. Leber and Rottenstein referred the organisms found in carious teeth to elements of the *leptothrix* fungus, and speak of them as characterized by the formation of a beautiful violet colour when treated with iodine and acids. The

term leptothrix was really indiscriminately applied to various organisms in the mouth, some of them giving the violet iodine reaction, some not doing so, some showing distinct articulations, others none at all, in fact, as Dr. Miller says in his "Micro-organisms of the Human Mouth," "Almost every living organism occurring in the mouth was designated by this common name. Hallier, and many of his successors up to the present time, adopted this view. The motile bacteria of the mouth were regarded as the swarm spores of leptothrix buccalis, the immotile (cocci, &c.) as the spores at rest. Elements of leptothrix buccalis were found everywhere." The term leptothrix is now usually restricted to the forms of micro-organisms which occur in the mouth as long thin threads, which show no divisions or articulations, and which are not coloured violet by iodine and acids. Very little is known with any certainty of the biology of the leptothrix forms in the mouth, they resist all attempts at cultivation on artificial media. If a scraping from the fur which forms upon the teeth is examined under a microscope, a matted collection of organisms is found, chiefly made up of masses of interlacing filaments enclosing in their meshes numerous micrococci and bacteria. To this thread-form, which is unjointed and does not yield a violet colour with acids and iodine, Dr. Miller has given the name of "Leptothrix innominata," the micrococci entangled in the meshes he does not consider to have any genetic connection with the threads, although they were formerly regarded as its spores. These threads and granules take a yellow colour with iodine and acids, but have no violet reaction. The long chains of bacilli which do show a violet colour with iodine the same author calls bacillus buccalis maximus, and the chains of micrococci which also show the same colour he names iodococcus magnus, other straight or curved filaments much resembling the bacillus buccalis maximus, but showing no violet reaction with the acids and iodine, he calls leptothrix buccalis maxima, but whether this is a distinct organism from the bacillus buccalis maximus or simply younger cell of the of the same organism, which in this stage do not yield the characteristic violet reaction, the author is unable to determine. It would thus seem that leptothrix meant very little as a strictly scientific term, it had been used as a convenient name by which to describe many various forms of micro-organisms in the mouth. And even when the subject was reduced to something more like order by the above classification they were still in complete ignorance

so far as to the life history of the leptothrix and the genetic relations of the different forms. Dr. Vicentini assigned to these organisms an importance even greater than they were supposed to possess before. He proposes to change the name of leptothrix buccalis in the old nomenclature (including the leptothrix innominata, leptothrix buccalis maxima and bacillus buccalis maximus of Miller) to leptothrix racemosa in order to indicate its fructification. This fructification, or sporulation, is only found in the upper layers of the leptothrix masses, whilst the old filaments of the same organism occupy, according to him, the deeper layers and constitute what has been formerly described, generally, as leptothrix buccalis. Dr. Vicentini used a $\frac{1}{25}$ th immersion lens in examining his preparations under the microscope, and describes the appearances as consisting of—1st, The fertile filament or central stem with reserve geminules inside; 2nd, The peduncles or sterigmata arranged in six longitudinal rows; 3rd, The sporals; 4th, A gelatinous protective envelope. The sterigmata or threads by which the sporules are implanted on the outside of the central stem cannot be seen with a lower power than a $\frac{1}{25}$ th. Dr. Vicentini was very anxious that the occurrence of these forms should be corroborated by others, and Mr. Mummery was also of opinion that it was desirable for the purpose of corroboration or contradiction that a thorough examination should be made by independent and competent observers. He had in conjunction with Dr. Miller made two attempts to see these organisms, and each time they were both unsuccessful, though on one occasion Mr. Mummery said he certainly detected appearances very similar to those organs which Dr. Vicentini compared to grape bunches, and made drawings of them at the time. The regular lines of rounded bodies which the author considered to be spores, and the central stem were plainly seen, but not the minute peduncles by which he described the spores as attached to the central stem. The club-shaped appearance of these bodies was also very evident, but so far Mr. Mummery had been unable to see anything that he could identify as corresponding to the two forms of the male organs, although he did not consider he had done justice to the author in his search for them, and intended to renew the attempt. The forms which he saw certainly seemed to be too regular in shape to be explained as an accidental accumulation of granules or micrococci around an isolated filament, an explanation which had been given by some observers. Looking upon these

appearances as representing the male and female organs of the leptothrix, Dr. Vicentini considered that this organism in its mode of reproduction showed analogies both with the fungi and the algae.

Turning to the theoretical aspect of the subject, Mr. Mummery said that Dr. Vicentini derives the hitherto known forms of micro-organisms from this one form, the leptothrix racemosa, in its various stages. For instance, he refers the filamentous forms, usually called leptothrix, to the inferior phases of the leptothrix racemosa. To the detached sporules of the female filaments he ascribes the micrococci found in the mouth, and to the detached male elements he attributes the comma-shaped bacilli and some other forms. Revolutionary as the views advanced were, they nevertheless found some support from bacteriologists of some eminence, for instance, Nageli and Buchner had held that the species of bacteria are not fixed but are affected by variations in external conditions. Dr. Vicentini's views therefore differed from those just mentioned, in that he derived the different organisms of the mouth from the different phases and forms of one parent organism. While it was well known that many micro-organisms are pleomorphic, *i.e.*, they appear under different forms, yet if the abnormal conditions which produce these differences are removed they return to their original typical form. Indeed if the dictum of instability were correct the scientific investigation of bacteria would be an impossibility, the view of inconstancy, however, had been rapidly losing ground as the methods of securing pure culture had advanced. In reply to the remark that his deductions do not harmonise with the results obtained by extended experience in cultivating mouth bacteria. Dr. Vicentini said his "arguments go to prove that culture experiments are not conclusive in deciding these cases of genetic connection, the inferior phases as in culture being common to entire families, the fructification being the fundamental differential character of the cryptogamic species." As Professor Miller points out, how, under Dr. Vicentini's views, can we account for the very different pathogenic action of the bacteria of the mouth; For instance: "A pure culture of the micrococcus of sputum septicaemia one or two days old will invariably kill a mouse or rabbit; a pure culture of some other bacterium from the same mouth under exactly the same conditions may have no action at all." This seems very extraordinary if they are all derived from one single form in the mouth. It was quite possible that as the study and knowledge

of these lower fungi advanced, and the whole life histories of particular organisms were more carefully worked out, it might be found that some of these organisms are only phases in the life history of a more complex one, as suggested by Dr. Vicentini, but it seems to the majority of observers very improbable that so many distinct forms, differing not only in appearance but in vital action, should arise from one parent form only. There seemed, in fact, so little on which to base this assumption that one might, with almost equal justice, derive all the bacteria found in the body from this same organism, and Mr. Mummery thought the author would scarcely admit that. In conclusion, Mr. Mummery said that while he did not wish to be held in any way responsible for the views of Dr. Vicentini, he thought them of sufficient interest to engage the attention of a society like that he was addressing.

Mr. STORER BENNETT detailed particulars of a case of more than usual interest seen by himself on the previous Monday. The patient, a man aged twenty-three, had been employed for some seven years in stained glass works, his special department being "leading up" the different portions of stained glass into position. His occupation, however, had apparently nothing to do with his condition; there was no sort of paralysis, palsy, wrist drop, or anything which would suggest lead poisoning. The mucous membrane of the gum, both in the upper and lower jaw, was extremely swollen, very soft, deeply red in colour, but at the same time not very vascular, for if one touched the surface with an excavator, and inadvertently pushed it through the membrane, little or no bleeding followed. On looking at the case at first one was inclined to think that possibly it was one of hypertrophy of the gum, but it was not hard or tense as it would be if that were so. One could peel away the gum from the teeth, and a very small amount of tartar was then noticed on them. On taking a blunt instrument one could not pass it between the teeth and the margin of the alveolus as one could in Rigg's disease. The patient had no difficulty in eating, and did not suffer in any way. He did not come to the hospital on account of the condition of the mouth, but on account of a rash, which yielded to treatment. So far as Mr. Storer Bennet had been able to gather, no case of the kind had been seen before in the human subject, but a similar condition was known in horses, and was generally noticed at the dry season of the year; putting the horses on grass food and giving them free purgatives generally resulted in their cure. It had been

suggested that in his patient's case it was some form of scurvy, but his blood had been examined and showed no tendency to hæmorrhage. The palate itself, and the gum on the left side was very enlarged, and the inside of the lower jaw on the right side was also swollen in a similar manner. The patient having been called in and examined by many of the members. Mr. Storer Bennett invited suggestions as to treatment.

The PRESIDENT stated that the subject of an alteration in the bye-laws of the Society had been under the consideration of the Council. It was felt that it would be a great advantage if in future the Annual Meeting were to take place on the first Monday in June, instead of the first Monday in January, as heretofore. The Council therefore recommended this alteration. After some conversation as to the various ways in which the change would affect the proceedings of the Society, resolutions carrying out the proposal and providing such alterations in detail as would be necessary were adopted. The first meeting under the new rule will take place in June, 1895, and the Officers elected for the present year will continue in office until then.

The PRESIDENT then delivered his Valedictory Address, the subject of which was a review of the work done in the Society during his term of office. The course he was adopting, he said, had the sanction of custom, and he thought it a good plan that they should from time to time take stock of themselves. Though commercially the year 1893 was one of gloom, for the Odontological Society it was a year of progress and activity. The President then commented in detail upon the various papers, and more important Casual Communications, presented during the year. With reference to the interesting communication from Mr. Mummery, to which they had just listened, he did not think the claim of Dr. Vicentini to have traced all the bacteria of the mouth to a common origin could be accepted without authoritative verification. Passing on to the subject of the changes in the bye-laws, he hoped, and believed, that they would result in the facilitation of business and the general convenience and well-being of the Society. Speaking of the Society's numerical strength, he mentioned they had lost six members by resignation, one by removal, and five by death, while there had been twenty-five new members, and one ordinary member transferred to the honorary list; there were also twenty-six names awaiting ballot. It now only remained for him to bid them farewell,

and to thank them for their generous indulgence with regard to his shortcomings, and to his enforced absence from many of their meetings. With respect to the latter point, he had striven to be at his post as frequently as possible, and might mention that out of the eight meetings he had attended five, travelling 4,000 miles in order to fulfil his duties. In conclusion he paid a warm tribute to the secretaries, officers, and Council for the assistance and support they had given him, and once more thanked the Society for the honour they had done him in electing him to the Presidential Chair.

Mr. David Hepburn proposed, and Mr. Howard Mummery seconded the vote of thanks to the President, and the votes of thanks usually accorded to the other officers were also passed.

The Meeting then separated.

STUDENTS' SOCIETY, DENTAL HOSPITAL OF LONDON.

ANNUAL GENERAL MEETING held Monday, January 15th, 1894, the President, W. H. WOODRUFF, Esq., in the Chair. The minutes of the previous meeting were read and confirmed. Messrs. Forsyth and Day signed the obligation book and were admitted members by the President. The President then declared the ballot open for the election of officers for the present year.

Messrs. A. B. Densham and Bonnalie were appointed scrutators.

On Casual Communications being called for, Mr. W. May presented the Society with some specimens of porcelain teeth made over sixty years ago by a dentist.

Mr. H. Lloyd-Williams showed a lower wisdom with its roots curved forwards, and Mr. Clarence asked whether it was not a case of dilaceration. Mr. H. Lloyd-Williams thought not.

Mr. Dalton showed an upper wisdom with "very nearly four roots."

Mr. D. P. Gabell showed two teeth, one with erosion and one attrition, and a very short bicuspid, and also a boy who had two peg-shaped supernumeraries in the place of his right upper central, which latter had erupted into his palate.

Mr. TREWBY (the Treasurer), read the balance sheet for the past year and also his report.

Mr. T. H. CLARENCE (the Secretary), then read his report.

Mr. N. G. Bennett moved and Mr. S. J. Hankey seconded the adoption of both reports, which was carried.

Mr. D. P. GABELL then gave notice of a resolution altering Rule XXIII., reading "May" for "January," and also the addition of a rule "That the Society's year commence in October."

The PRESIDENT then called on Mr. J. T. Hankey for his paper on "Crowns." (See page 56).

Mr. A. B. DENSHAM gave one or two hints upon the subject of pivotting, which he had heard from Mr. Hern. A very good method of getting an accurate impression of the prepared stump being to use a small metal cap soldered to a pin, and Gilbert's gutta-percha used as the impression material. This gives a very accurate impression of the root and also the length of pin available. He had found root facers more useful than any other form of root trimmers, as they produced a good surface without pain or laceration of the gum. The time of both patient and operator is saved by working to the model of the root obtained by means of the metal cap and gutta-percha method. A very good method of making a pivot is to have a half collar at the back; this collar bears a great amount of the forward strain thrown upon an incisor pivot, and as the collar is not carried round the front, any recession of the gum does not expose shining metal.

Mr. DOLAMORE was glad to have heard the paper, and Mr. Densham's description of Mr. Hern's method. He, himself, is in the habit of working to the mouth without models. He could not agree with the stress Mr. Hankey laid on obtaining a long pin, he thought one $\frac{3}{8}$ ths of an inch quite long enough, and, provided it were well filled with a cement, failure to hold would be due to defective manipulation, which, however, he granted, might occur without any apparent fault of the operator. The chief cause of failure is breakage of the pin near the neck of the tooth, a calamity which could be avoided by attention to the fit of the crown, and the condition of the bite. He feared, that the porcelain face of the crown, described by Mr. Hankey, would be liable to be broken in mastication, and would prefer to protect it by bevelling the cutting edge of the face and carrying the gold well over this.

Mr. K. F. LANE suggested that if a fairly thick piece of platinum or gold were used, and inlaid down on the stump with an

automatic mallet, a very accurate fit could be obtained ; further, when the thick metal is used it is not so liable to "pucker up as the thin."

Mr. ROCHE asked if Mr. Hankey did not think that there was a great chance, owing to the friction of mastication, of the porcelain becoming loose if the pins were not soldered to the backing.

Mr. GARTRELL, at the request of the President, said that the pivot he used was made by fitting platinum cap and pin to the root in the usual way, the pin being left long enough to reach the cutting edge of the tooth. The pins of the tooth are then soldered to the pin of the pivot, without the tooth being backed. The space is then filled in with continuous gum instead of solder. Platinum and pure gold solder are the only metals used.

Mr. MELLERSH said that when making a cap for a Logan crown a thick piece of platinum foil might be used instead of gold, being more readily worked.

Mr. COLYER suggested the use of the Herbst bands for measuring roots.

Mr. GABELL said that the strength of a collar crown with a pin and diaphragm was very great ; he had seen a case in which one bicuspid thus made bore the brunt of the bite, a tube tooth and pin having been broken before. He thought the method of measuring recommended by Mr. Colyer was liable to get out of order by the stretching of the gold bands.

Mr. HOPE asked, was it necessary to remove the enamel ? It was a brutal operation, and did it make the crown last longer ?

In his reply, Mr. HANKEY said that Mr. Lane's suggestion of using thick platinum, and malletting it with the automatic mallet, was to him, quite a novel idea. He would not mention Mr. Densham's first remarks, as Mr. Dolamore had already done so, but the platinum half-collar referred to, he had commented upon in his paper. The method of bevelling the cutting edge of the tooth, and burnishing the backing over it, advocated by Mr. Dolamore, was, he thought, an extremely useful suggestion, the objection to it being that the gold showed when the patient's mouth was open. In answer to Mr. Roche, he thought the possibility of the tooth becoming loose was very small, as it has very little strain upon it. The *modus operandi* of filling the cap to the collar, quoted by Mr. Mellersh, was similar to his description, the only difference being that Mr. Mellersh used platinum where he used

gold. Having had so little experience, he could not undertake to give the average life of an ordinary Logan crown. He did not agree with Mr. Collier, that the Herbst method of obtaining the size of a root was the best, for every time the gold collars were tried upon the root they must stretch a trifle, consequently, after a trial or two, they would be larger than the size their number indicated. In reply to Mr. Vacey Hope, he reiterated most emphatically the necessity of coning up the root before fitting a collar.

He then concluded by thanking the President and members, for their kind reception and comments upon his paper.

The PRESIDENT then said a few words of farewell.

Mr. COLYER proposed a vote of thanks to Mr. Woodruff for the kindness and sympathy he had shown the Society during the past year, which was carried with musical honours.

The PRESIDENT having suitably replied, the names of the newly-elected officers was then read:—*President*, Mr. A. E. Clayton Woodhouse; *Vice-Presidents*, Messrs. W. S. Holford and T. H. Clarence; *Treasurer*, Mr. W. M. Jones, *Secretaries*, Messrs. D. P. Gabell and H. W. Trewby; *Curator and Librarian*, Mr. H. Norman.

Second Year's Councillors, Messrs. J. Main Nicol, S. J. Hankey, H. Mackley, K. F. Lane, W. Nowell.

First Year's Councillors, Messrs. McKay, Pidgeon, Marston, and S. Colyer.

A vote of thanks to Mr. Hankey for his paper and the gentlemen who brought forward Casual Communications was then passed.

The PRESIDENT announced that the next meeting would be held on Monday, February 5th, when Mr. J. Main Nicol would read a paper on "Pain."

The proceedings then terminated.

WE regret to announce the death of Mr. John Tidswell, of Bradford.

THE Third Annual Smoking Concert of the Athletic Club of the Dental Hospital of London, was held on Saturday, January 20th, at the Frascati Restaurant, Oxford Street, and proved a highly pleasant gathering.

THE DENTAL RECORD, LONDON: FEB. 1, 1894.

**THE DISCOVERY OF THE ANÆSTHETIC POWERS OF
ETHER.**

THE *Virginia Medical Monthly* contains a contribution, from the pen of Dr. Luther Grandy, which throws new light on the discovery of the anæsthetic powers of ether. The merit of this has been most usually granted to Morton, the pupil of Wells, whose name will ever be associated with the use of nitrous oxide for producing anæsthesia. Priority of use has, however, been justly claimed for a Dr. Long, but the story, which has gained currency, is that given by Dr. Dudley Buxton in his book on "Anæsthetics." He says:—"About the year 1840 it was a common trick at lectures, and among medical students, to inhale ether vapour in order to induce exhilaration. A number of lads were indulging in this pastime in the outskirts of Anderson, S.C., and, to stimulate further their mirth, seized upon a negro boy and forced him to inhale ether, pressing the vapour upon him until he became deeply narcotised and apparently dead. In an hour, however, the negro came round, to the delight of his tormentors. This scene impressed itself so deeply upon one of the lads named Willite, that, when three years subsequently, he became the pupil of a Dr. Long, of Jefferson, Jackson County, U.S.A., he narrated to him his experiences of ether. As a result, Dr. Long, in 1846, administered ether to a patient, and while he was narcotised removed a small tumour." Thus, it will be seen, the merit of observation is accredited to Willite, but it is affirmed by Dr. Grandy, that, as a matter of fact, "Willite did not become a student of Dr. Long in his office, until the latter had done several operations under ether," moreover, he publishes a certificate from Willite, presented to Congress during the ether controversy, in which the following sentences occur:—"I entered the office of Dr. C. W. Long, of Jefferson, Ga., in October, 1844, where I continued about

eighteen months. Not long after I entered his office, and not later than 1845, I heard the said Dr. Long speak of having used sulphuric ether by inhalation, to prevent pain in surgical operations, he referring to a time before I entered his office." Willite and Long seem to have been friendly, and, whether the former started the negro story or no, he, at all events, was anxious in 1877, that Long should have the merit of the discovery, this is abundantly testified by several letters, written by Willite to Long, asking for full particulars of the incidents, in order that they might be published, and honour given where honour was due. In one of these he distinctly states, that:—"I did make a mistake about my being present at the first or second operation, which mistake I will correct." We have then, first, the fact that the administration by Dr. Long in 1842 was prior to Willite becoming a pupil by two years; second, Willite's own testimony that he was not present at the first operation, and third, that Willite himself regarded Dr. Long as the discoverer. So far, we have nothing to show the incidents that led up to Long's discovery, doubtless it was more or less accidental, and buried in the country, one hundred and thirty miles from the nearest railroad, his discovery can have led to little stir, though it seems to have been well enough known in the immediate neighbourhood. But Dr. Long's action cannot but make us respect the man, who was content to let the matter rest on its merits, and stands in somewhat unhappy comparison with that of Morton, who, giving the drug a quack name "Letheon," patented it, and then tried to sell it to the States for \$100,000. Yet, good does sometimes come out of evil, for had not Morton noised the fame of ether abroad, had men's attention not been arrested by the very acrimony of the discussion, years might have gone by ere the facts would have been widely known. Nay! it is possible they might have sunk back into oblivion, and have been reinterred in the little wayside village of Jefferson. Long removed to Athens soon after his discovery, and died there in 1878.

News and Notes.

It has been decided that, in Missouri, U.S., according to the law of that State, a "dentist is neither a doctor nor a surgeon, and is not, therefore, exempt from jury service as an M.D. We may remind our readers that, though Clause 30, of our "Dentist's Act, exempts them from serving on all juries and inquests, yet the burden of seeing that their name is not on the jury list lies with them. If they are called they must appear and excuse themselves.

At a Meeting of the Nottingham Medico-Chirurgical Society, held on January 3rd, the following resolutions were proposed by Mr. Tresidder, one of the Hon. Secs., as the result of a letter received by him from the Secretary of the Notts and Derbyshire Dental Association. (1). That this Meeting considers it unprofessional for registered medical men to give anæsthetics for unregistered or advertising dentists. (2). That the Notts and Derbyshire Dental Association be asked to furnish every registered practitioner in the neighbourhood with a printed list of those dentists whose names are on the register and who do not advertise. In introducing the motion, Mr. Tresidder said that the dental profession was a branch of the medical profession. That a petition signed by 370 of the leading dentists of Great Britain has been presented to the Medical Council, praying them to strike off the register dentists who advertise as being guilty of conduct, infamous and disgraceful in a professional respect, and that this petition has received due attention and had been looked favourably upon by the Council. He said he did not anticipate any opposition to this resolution, for he could not conceive why, as members of a learned profession, they should withhold their aid from the dentists who were endeavouring to elevate their calling from the position of a trade to the rank of a profession. The resolution was seconded by Mr. Anderson, whose remarks were couched in a similar strain. The first resolution was then put to the meeting and carried by a big majority, some two or three hands only being held up to show dissent. The second resolution was also put and carried in a similar manner.

IN a short paper by Dr. Lester Noble published in the *International* we get, *inter alia*, an interesting glimpse at methods in vogue, half a century back, for manufacturing artificial teeth, by one of the many dentists who, in those days, preferred to make those they required at home. Dr. Noble describes the methods of a Dr. Keep. He says:—After the plates had been fitted, and a set of teeth carved out of wax, the exact size and style required, moulds were made. When the teeth were moulded they were baked slightly, just enough to give them strength, and yet be easily cut with a little twist drill held by the thumb and finger. We made four or six holes in a front block of six teeth and three or four in a side block of four teeth, and they must be absolutely parallel in both directions. The enamel was then placed on, and the gum color, inside as well as outside. This was a specialty of Dr. Keep's. The teeth were again baked until properly vitrified. This accomplished, a wood cylinder was fitted to each hole, and the gold wire to be used for pins, soldered on the gold plate, which fitted accurately this cylinder. With moderate pressure, the central block of six teeth would go to its exact position on the plate; the side blocks were put in place in the same manner. It may appear a difficult task to place these pins on the plate with such exactness that the block would go down without binding, but it could always be accomplished. When the set was wet, or even moistened, the teeth were perfectly tight; after a thorough drying they could at any time be removed.

WE have referred to the discovery of the anæsthetic power of ether elsewhere, but the tragic ending of Morton and of Wells, disappointed through not having the full credit and reward of the discovery of ether, is, perhaps, forgotten. Wells committed suicide, Morton, during an attack of brain fever jumped from his buggy and died of his injuries, and Jackson, who assisted Morton in his work and claims, went mad and died after years in an asylum.

THREE new points in connection with Logan crowns are given in the *Dental Review*.

1st, by H. S. Lowry, for setting a Logan crown with gutta-percha. The crown is adapted to the root of the tooth, then base-plate gutta-percha is wrapped around the pin and adapted to the crown, the pin and tooth being heated so that the

gutta-percha sticks. The root canal is wet with water, to prevent the gutta-percha from sticking. The prepared crown, with gutta-percha in place, is heated with water and pressed to place, repeating the operation, trimming off excess until a perfect fit is secured; then all is made dry, the gutta-percha smeared with chloro-percha, and the crown driven to position with a mallet.

2nd, by J. D. Patterson. After sealing the apical opening, grind the root under the free margin of gum, select the proper tooth, wrap very thin platina plate once round the entire length of the pin and solder with pure gold. Now prepare the root to receive this barrel, then burnish 32-gauge pure gold over stump, solder the barrel to the cap, insert barrel and cap, and with a wooden dowel mallet and burnish cap to a perfect joint with the stump, and trim the cap to the periphery. Now remove cap and barrel and you have the exact surface of the stump *out of the mouth*, to which you can rapidly grind the tooth to fit. Then cement the barrel and cap to place on the root. We then have the tooth perfectly protected and a metal wall perfectly fitted to the post and crown. When cement is hard, then insert crown to place.

3rd, by S. B. Prevost. First grind the tooth so that it approximates a fit, the root is banded, the band ground evenly with the end of the root, removed, and a disk fitted to the band and soldered into place, a hole punched for the admission of the pin of the crown, the cap is replaced, and the crown fitted nicely to the cap, but the posterior or distal part of the crown is ground away so as to leave a wedged-shaped opening, the crown removed and a disk of thin pure gold is burnished to the end of the crown, a little hard wax is placed over the disk, when the crown is driven to position, the whole removed, invested, and the wedge-shaped opening filled with a high grade of plate or solder. The crown is then finished and set with cement. The crown can be set so that but little, if any, of the band shows.

THE Annual Dinner of the Dental Hospital of London Athletic Club, will be held on Tuesday, March 6th, at the Criterion Restaurant. S. J. Hutchinson, Esq., in the Chair. Time 6.30. Tickets may be obtained of the Secretaries, Messrs. Henly and Forsyth, at the Hospital.

THERE is a vacancy at the Dental Hospital of London for an Assistant Dental Surgeon. Applications must be sent to the Secretary by March 12th.

THE following were elected Officers of the Metropolitan Branch of the British Dental Association, for 1894, at the Annual General Meeting, on January 24th:—*President*, Robt. H. Woodhouse, M.R.C.S., L.D.S.Eng.; *President Elect*, E. Lloyd-Williams, M.R.C.S., L.D.S.Eng.; *Hon. Treasurer*, W. R. Humby, L.D.S.Eng.; *Hon. Secretary*, Sidney Spokes, M.R.C.S., L.D.S.Eng.; *Council*, John Ackery, M.R.C.S., L.D.S.Eng.; Leonard Matheson, L.D.S.Eng.; Harry Rose, L.D.S.Eng.; Charles S. Tomes, M.A., F.R.S., &c.; Joseph Walker, M.D., M.R.C.S., L.D.S.Eng.; C. J. Boyd Wallis, L.D.S.Eng.; Willoughby Weiss, L.D.S.Eng.; W. H. Woodruff, L.D.S.Eng.; W. Hern, M.R.C.S., L.D.S.Eng.; W. B. Paterson, M.R.C.S., L.D.S.Eng.; H. G. Read, M.R.C.S., L.R.C.P., L.D.S.Eng.; C. Robbins, L.D.S.Eng. The list of Officers of the Odontological and Students' Society will be found on another page, under Society Transactions.

MANY, like Mr. Beacock, of Ontario, must have been troubled by the rattling noise made by a polishing lathe after it has been in use some years. It is, of course, due to the spindle having worn loose in its bearings. All should adopt the above named gentleman's remedy. Take off both caps, file a little from the under side and replace.

IN our opinion, the wicks usually sold for the spirit lamps are too tightly packed in their web covering. The spirit does not pass through as quickly as required, hence, not only spirit but wick burns, causing a flame bad in quality and quantity; a waste of wick, and the annoyance of its, more often than needful, being too short and having to be replaced just when the lamp is most urgently wanted. Remedy:—Pull two or three strands out of wick before using. Obvious, isn't it? Still, we didn't see it, till told, and perhaps others may be equally blind.

Dr. A. W. HARLAN has resigned the Editorship of the *Dental Review*, he is succeeded by Dr. C. L. Johnson. Dr. Harlan intends visiting Europe on a rest trip after his labours for the Chicago Congress. It will be remembered that he attended the Annual Meeting of the British Dental Association in London in 1891.

Journalistic Selections and Abstracts.

THE BUNSEN BURNER.

In the Bunsen or atmospheric burner the gas merges from a central nozzle, and, passing unburnt up the burner tube, draws air with it by injection action through an opening provided near the inlet. The mixture of air and gas which, according to our experiments, varies from 63 per cent. of air with 37 per cent. of gas to 71 per cent. of air with 29 per cent. of gas, can be lighted at the top of a tube, where it burns with a faint blue perfectly smokeless flame. It may be assumed that the air so introduced enables the carbon which is concerned in rendering the flame luminous to burn at once. Comparatively recent observations have shown, however, that this explanation is incomplete, if not incorrect, for if instead of mixing air with the gas, inert gases, such as nitrogen or carbonic acid, be employed, the flame similarly becomes non-luminous. Professor Vivian Lewis, who has devoted a great deal of attention to the subject of flame, maintains that luminosity is due to the formation at from 1000° C. to 1200° C. of acetylene from the original hydrocarbons, but that the moment the temperature is reached by the combustion of the hydrogen and carbon monoxide, the acetylene formed decomposes, with a further rise of the temperature, and the carbon heated to incandescence radiates heat and light. On this theory the following is the probable explanation of the chemistry of the non-luminous or Bunsen flame. The nitrogen of the air acts in the normal Bunsen flame by so diluting and protecting the hydrocarbon, that a far higher temperature is needed for their decomposition and this action gives time for the oxygen of the air with formation of acetylene or the liberation of carbon, and hence without luminosity. The cooling of the air introduced, which is able to add to the general result, leads to loss of luminosity, although the cooling is less than the increase in temperature brought about by the oxidation due to the oxygen in the air. There are two drawbacks to atmospheric burners: first, the non-luminous flame may exhibit a tendency to "light back"—that is, to run down the burner tube to the supply nozzle; and, secondly, the phenomenon of injection in the Bunsen burner, by which the air is mixed with the gas, gives rise to a roaring noise resembling the escape of gas from a pipe. "Lighting back," or the ignition of the gas in the burner tube till

it reaches the small gas nozzle inside the air-mixing chamber, may be caused by a down draught acting against the upward pressure of the mixed gas, or more commonly it results from too small a nozzle or choking of the nozzle, or else insufficient gas pressure to effect the complete injecting action. The defect of lighting back is a serious one, and has created considerable prejudice against this system of gas firing, from the fact that when a burner lights back incomplete combustion is the result, offensive acetylene is produced, and the fuel is blackened with soot. It can only be obviated by strict attention on the part of the maker to the proper adjustment of the burner, and on the part of the consumer to the regulation of the gas supply, by allowing sufficient pressure to act upon the burner and by occasional cleaning of the burner. Lighting back frequently happens when the burners are first lighted, arising from the admixture of the gas with an excess of air present in the supply-pipe or in the burner. Before lighting, therefore, it is best to allow a small quantity of gas to escape. Governors or regulators fitted to each burner if there are separate taps obviate the necessity of regulating the main pressure, and give perhaps the most satisfactory results, although we have noticed a tendency in the flames of burners provided with governors to become in part and gradually luminous. The second drawback, which is occasioned by the roaring noise of the injector, is a difficulty which has not been satisfactorily met. Certain attempts have been made to produce a noiseless burner, but there is still room for considerable improvement in this direction.—*Lancet*.

TAKING IMPRESSIONS OF THE MOUTH.

By the late JAMES W. WHITE, M.D., D.D.S.

THERE is probably no department of dental practice in which so large a number of practitioners find themselves at times unsuccessful as in the taking of impressions of the mouth. It is hoped that advantage being taken of all the available literature of the subject, practical hints are presented which will be of service, at least to beginners, in helping them to the attainment of better results in practice. Without a correct impression of the mouth to begin with, no subsequent care or skill can secure a good result, no matter of what material the base may be composed.

The first thing to be considered is the character and condition of the mouth,—1, whether there are teeth remaining or not; 2, if so

their shape and position ; 3, the character of the arch, large or small, deep or flat ; 4, the ridge, irregular or smooth ; 5, the state of the gums, if uniformly hard or soft, or hard in some places and soft in others, *e g.*, ridge hard and palate soft, or soft ridge and hard palate.

When an artificial denture with a vacuum-chamber has been worn or a plate or appliance of any kind has imbedded itself in the tissues, or caused irritation, it is well to have the patient leave out the plate for several hours previous to taking an impression.

Having ascertained all the difficulties to be overcome, the next step is to select a suitable tray in which to take the impression. This should be of such shape and size as will allow its easy introduction into the mouth ; also adapted to the particular case in hand, and with reference to the material to be employed. It should be large enough to embrace the alveolar ridge, leaving a space of an eighth or a quarter of an inch between its outer rim and the gum. The nearer it comes within these limits to fitting the mouth, the less material has to be employed, the less pressure is required, the less surplus material to offend the patient, and the more perfect the impression is likely to be. On the other hand it must not fit too exactly else *drawing*, if the impression be of wax, or complicated *fracture*, if it be of plaster, will be almost certain to occur. The proper size should be determined by trial of the empty tray in the mouth.

More care is required in the selection of a tray for the inferior than for the superior jaw, for the reason that, owing to its divergence at the posterior part, and the extreme narrowness of the ridge, a slight variation will cause it to cut into the soft tissues and become painful to the patient, besides preventing a correct impression. The tray should pass well back towards the rami of the jaw and cover the border completely. If teeth are remaining, a tray specially adapted to such cases should be used, either deep enough to receive them or with a portion of the tray cut out to permit their passage, or an impression in modelling composition, wax, or gutta-percha should be first taken to approximate the required form.

A varied assortment of special trays is supplied by the manufacturers, adapted for partial upper and lower cases, and for crown and bridge work, others adaptable to varying necessities, the shape and size being readily adjustable by bending or twisting to meet unusual presentations of the teeth, gums, or palatal arch. In some the side walls are cut free from the bottom, and in others the palatal portion

is cut free, with slots running across the bottom toward the rim. Some are made with flat bottom and square sides, and others with raised palatal edges, to prevent the plaster slipping off the tray, still others with the rim of the tray adjoining the handle cut away, so as to procure a perfect impression of undercuts or shelving gums. For partial lower dentures trays are provided with an opening to allow the front teeth to pass through, and the tray to pass down to the maxillary ridge. An adjustable lower impression tray suggested by Professor Henry I. Dorr has posterior lingual wings, which enable the operator to obtain an accurate impression of the jaw on either side of the tongue, the wings being easily spread apart or brought toward each other, or twisted to adapt the tray to almost any size or shape of the edentulous lower jaw.

A temporary tray may be made from an impression of modelling composition or of gutta-percha, which will answer a very good purpose, but it should be enlarged by cutting away around the alveolar border and palatal arch, and roughened to retain the material used.

A modification of the ordinary tray may readily be made with modelling composition or with wax, to adapt it to a special case provided it be of sufficient size to admit the necessary additions. In some instances better results may be secured by bending and refashioning a Britannia tray, in any case the tray should possess a reasonable adaptation to the alveolar ridge and palate, if a perfectly satisfactory impression would be secured. The objection to the porcelain tray is that it cannot be modified to suit special cases and is so smooth that the impression material may leave it and cling to the mouth. This, however, if considered desirable, can be provided for by oiling a metallic tray. If the smoothness of a new Britannia tray is objectionable, a little roughening of the surface will cause the plaster to adhere.

Having decided upon the tray to be used, the next question to determine is the material to be employed.

If the object sought in taking an impression is to obtain a correct representation of the parts as they are in their normal condition, there is needed a substance plastic at ordinary temperatures, and which will admit of having the parts concerned pressed into it without the use of force enough to cause pain or disturb the relative position and form of the different surfaces. It must also possess sufficient hardness or body to be retained in the tray under the pressure necessary to obtain an impression of the parts. It must

solidify or harden in a brief time, and under conditions as to heat and moisture not incompatible with the mouth. It must not materially contract or expand in cooling or hardening, and at the same time should as nearly as possible be free from objections as to taste, smell, or appearance.

The substances or compounds in use differ widely in their physical characteristics,—wax, white and yellow ; combinations of wax with paraffin, with gutta-percha, and with other materials ; modelling composition ; gutta-percha, alone or in different combinations ; plaster of Paris, alone or conjoined with the use of wax. It would doubtless be unsafe to say that in all cases one of these materials will answer as well as another. Plaster of Paris is used almost exclusively by a majority of practitioners. Next in order as to extent of use is modelling composition, then wax and wax compounds, and lastly gutta-percha. A knowledge of the distinctive properties and applications of each is desirable.

When it is desired to displace soft parts to obtain a uniform bearing for a denture, the absence of elasticity in wax is considered an advantage. By others insistence is made as to the necessity of an exact copy of the parts as they present, subsequently carving it to adapt it to the requirements of a denture. From this standpoint plaster of Paris would be the most desirable material for taking the impression.

A metallic plate stuck up on a zinc die is smaller than the mouth, by reason of the shrinkage of the die,—unless the shrinkage is compensated for by the enlargement of the sand impression in removing the mould ; a vulcanite plate is larger than the mouth, because of the expansion of the cast,—unless this expansion is counteracted by the shrinkage of the material in vulcanizing : consequently the compression made by the force required, in taking an impression in wax, or the contraction of gutta-percha, may be made to serve a useful purpose. It is evident, therefore, that no definite rule can be given applicable to all cases ; very much must be left to the judgment of the operator. It is frequently difficult to decide in advance which is the best material for a given case, and experiment alone can decide.

Wax is usually chosen by beginners, on account of the ease with which it is manipulated, and also because the general directions for its employment are alike applicable in the use of other impression materials.

In cases of irritable fauces, inducing nausea, it has been recommended to lessen, the irritability by previously gargling with a strong solution of tannin, or potassium bromide, or with camphor-water : others have recommended that the fauces be accustomed to the presence of a foreign body, by passing the feather end of a quill over the parts a few times before taking the impression, or by directing the patient to manipulate the parts frequently with a spoon for a few hours previous to the impression being taken. Such manipulation will, however, sometimes cause nausea, and vomiting, especially if practiced after taking a meal. Others consider that the surest way to prevent retching is to force the patient's chin well down upon the breast, after the tray is in place, and so retain it until the impression is removed. Others, again, direct the patient to place the tongue upon the posterior portion of the tray, and retain it in that position. The act of swallowing is likely to produce a sensation of nausea by bringing the soft palate into contact with a foreign body ; the patient should therefore be advised to avoid swallowing during the operation. Nausea is frequently induced by the tray extending too far back in the median line (a fault with many of the trays on the market), and by the use of too large a quantity of impression material. In exceptional cases of extreme sensibility of the mucous membrane to contact with any impression material, a five per cent. solution of cocain applied lightly over the soft palate is said to have proven satisfactory. In like cases the administration of a few inhalations of nitrous-oxide gas has effected good results.

The insertion of the tray may seem a trifling matter to the operator, but is frequently not so to the patient. Few lips will admit an impression tray direct without an amount of stretching at once inconvenient and painful ; and, in some cases, to secure a correct impression without subjecting the patient to serious discomfort, will require no little care and expertness on the part of the operator. Unusual width of the jaw is not infrequently associated with a contracted commissure, and, in addition, the muscles of the mouth may be rigid, and unyielding. Another difficulty is in the common attempt of the patient to open the mouth wide in an effort to assist the operator. The patient should be directed to guard against this by allowing the jaw and the lips to be entirely under the control of the operator, who, standing, to the right of, behind, and over the patient, should present the tray obliquely to

the mouth, one side resting against and pressing outward the corner of the mouth, while the opposite corner should be extended with the first and second fingers of the left hand ; the tray should then be passed in with a rotatory movement to bring it into line.—

Cosmos.

PYORRHŒA ALVEOLARIS.

AT the regular meeting of the New York Odontological Society, held November 21st, 1893, Professor C. N. Peirce, of Philadelphia, read a paper on the "Etiology of Pyorrhœa Alveolaris" in which he stated that, in the effort to reduce this disease to its simplest factors and determine the primary origin of each, he should coin two terms, which he thought would be more expressive as to the true nature of the disease. He believed that in one form of calcic pericementitis the origin of the salt was the saliva, and in the other form, the blood ; the former he therefore designated as ptyalo-genic calcic pericementitis, expressing the idea that in its origin it is local, peripheral, and salivary ; the latter he designated as hæmato-genic calcic pericementitis, expressive of the idea that in its origin it is constitutional, central, and associated with some modification of the normal composite of the blood-plasma. This latter he believed was the condition in true pyorrhœa. In this he suggested that possibly some chemical agent derived from the blood, the product of some morbid constitutional state might be the exciting cause. With the view of testing the plausibility of this assumption, he had the deposit removed from the apical extremities of teeth which had been sacrificed by this so-called pyorrhœa, and subjected to chemical analysis. In every instance the chemical methods employed revealed the fact that the deposit was a combination of calcic urate, sodic urate, with some calcic phosphate and carbonate. *The existence of the urates, in which the uric acid is the predominating element, shows that this deposit is a precipitate from the blood exudation and the irritation of constitutional origin,* the disease, if these analyses are confirmed by subsequent experiments, being but another phase of the uric acid or gouty diathesis. These deposits were examined by Professor Ernest Congdon, of the Drexel Institute, whose experimental skill is a sufficient guarantee for the accuracy of the results obtained, and subsequently repeated by Professor A. P. Brubaker with the same results.—*International.*

THE FUSION OF GUM SECTIONS.

BY DR. BRIMMER.

THE teeth are ground up and articulated the same as any other case, with this provision, that they must have wide V-shaped joints to allow for the rapid flowing of the flux or enamel. Then after the teeth are arranged in position and articulated properly, there is an investment with half plaster and half asbestos. After this has hardened and dried sufficiently, a little platinum wire is laid across the platinum pins, and that is fused with the blowpipe, which gives it an added strength. Then take that and the skeleton and invest the joints with this enamel material, putting it in the oven, or rather on the slide. There are three different movements in the gradation of the heat, as it gradually comes to the fusing point. The slide is left in the first position about three minutes, and at the end of three minutes it is raised one-third more of the distance, and at the end of three more close it. When you get it in the oven allow it to remain there fifty-five seconds. This same operation with gas will take about five minutes, so you can see there is quite an item in the amount of time saved. This operation gives quite a respectable appearance to a set of teeth on rubber. It gives the plebian base quite a patrician appearance, and it has almost the appearance of continuous gum.—*Review.*

Review.

DISEASES AND INJURIES OF THE TEETH, INCLUDING PATHOLOGY AND TREATMENT: A Manual of Practical Dentistry for Students and Practitioners. By MORTON SMALE, and J. F. COLYER. Published by Longmans, Green & Co.

The steady advance made year by year, in the science and art of Dental Surgery, has brought new knowledge to be focussed on the scientific side, and fresh methods to be described in the art of the dentist, that the time has arrived when a work such as this is welcome, especially as it emanates from authors so well qualified by experience in teaching, to weigh the pros and cons of the subject they treat.

LETTERPRESS.—The letterpress is clear, legible, without crowding, and pleasant to read. The method adopted throughout the work of printing new paragraphs in bold thick type, and important headings or passages in italics, is an extremely good one,

as it serves to arrest the eye of the reader, and to emphasise important points, thus combining the characters of a manual with that of a note book.

ILLUSTRATIONS.—The illustrations are numerous and well executed, very many are entirely original, and all betray the fact, that a great deal of minute and painstaking care has been bestowed on them. In the teaching of students ocular demonstration is at all times an important aid, both to the comprehension of a point, and to memory in retaining it, we are glad, therefore, to see illustrations used to such good purpose in a manual destined especially for the use of students. We mention particularly the diagrams illustrating the chapter on the Treatment of Caries, which are excellent, also those in the chapter devoted to the Extraction of Teeth, which show, at a glance, the relative position of operator and patient, the method of holding the forceps, and the use of the fingers and thumb of the left hand in supporting the patient's jaw, and keeping the tongue and lips out of the line of vision of the operator. These latter diagrams will, we think, be as useful to the general medical student, as to his special dental *confrère*. Particular mention must also be made of the excellent series of diagrams, photo-micrographs and others, illustrating the histology and pathology of the dental pulp and tissues.

The book is divided into 23 chapters, with a total of some 400 pages, the number of pages devoted to each subject is in fair and fitting proportion to their importance, *e.g.*, Chapter IV. on Abnormalities of the Permanent Teeth, in which term the writers include Irregularities of the Teeth, and their Treatment, occupies 98 pages, in this chapter the main considerations, that are to guide the dental surgeon in the treatment of irregularities, are laid down with clearness and good judgement. We would endorse the authors wholesome condemnation of fixed apparatus in the treatment of irregular cases.

Chapter VI., on Caries, fills 20 pages, and is a fair and full *résumé* of present knowledge in regard to the Etiology of Caries, we note with approval the prophylactic measures recommended in the latter part of the chapter.

Chapter VII., on the Treatment of Caries, which we regard as the "*pièce de résistance*" of the work, occupies 61 pages, and is worthy of the highest praise, both as to the illustrations, as well as for the practical and thorough dealing with the subject throughout.

Chapter VIII. on Diseases of the Pulp and its Treatment, has 35 pages devoted to it.

We regard this chapter as a little wanting in clearness when differentiating the symptoms and signs of hyperæmia, acute, and chronic inflammation of the pulp, respectively. The advice given on page 245, line 1, when speaking of dealing with the contents of pulp canals of anterior roots of lower molars, "in leaving them alone" is, in our opinion, unsound in principle, when regarded in the light of the rigorous demands of present day antiseptic surgery. We question, also, whether it be judicious to recommend to students, when treating dead teeth, that:—"Immediate root filling is, in the great majority of cases, the best method to adopt."

We are pleased to see a chapter devoted to Fractures of the Jaws, not only for teaching dental students, but also to draw the attention of the general surgeon to the fact, that fractures of these bones can only be effectually set, and retained in immovable apposition, by means of inter-dental splints.

The Chapters on Necrosis of the Jaws, Chapter XVIII.; on Antral Empyæma, Chapter XIX.; on Trismus, Chapter XX.; and on some Common Affections of the Tongue met with, Chapter XXII.; are all well and carefully treated, and although nearing the border line of General Surgery, contain information which any practising dental surgeon ought to possess, for diagnostic purposes, if not for treatment.

In the latter part of Chapter IX., pages 272—276, which is devoted to the consideration of Pyorrhœa Alveolaris, and in Chapter XII., which is given to Saliva and Salivary Calculus, the clearness and precision which characterize the greater part of the work, has given place to a much less lucid dealing with the subjects treated. The authors having apparently neither decided what is the origin of the hard, dark rim or nodule of tartar found *under the gum*, nor what part it plays in its association with the disease Pyorrhœa Alveolaris.

1. As to origin:—

E.g., Page 274, lines 13—14 we read "the hard rim of tartar so frequently seen in these cases is probably derived from the secretion from the periosteum."

Page 309, lines 10—14, we read "The hard dark rim of tartar situated under cover of the gum, is probably not a deposit from

the saliva at all, but from the glands situate in the neighbourhood of the necks of the teeth."

Page 309, lines 14—15 "the deposit found in pyorrhœa alveolaris is probably also derived from the discharges."

2. Again as to Causation :—

Page 274, lines 12—13 "the presence of some irritant, such as tartar, may in some cases act as the predisposing cause."

Page 273, lines 9—11 "the ring or nodule of hard tartar is generally present, though not always, and must probably be regarded as a result of the disease rather than a cause."

Page 275, in summing up the question, lines 14—15, we read "Pyorrhœa seems to be excited in many instances by local irritants, such as the presence of tartar."

The question therefore remains whether this rim or nodule of hard tartar is derived :—

1. From the periosteum as a secretion ;
 2. From the discharges ; or
 3. From the glands at the neck of the teeth.
- (a) Is it a predisposing cause of pyorrhœa alveolaris, as hinted on page 274, lines 12—13 ?
- (b) Is it an exciting cause, as suggested by the summing up on page 275 ? or
- (c) Is it a result of the disease, as declared on page 273, lines 9—11 ?

With all its good qualities, however, the work contains many defects and blemishes. Obscure statements, loose grammatical construction and careless wording, as well as a number of printer's errors, are to be found scattered through the book.

In the introduction, the dental surgeon "in reply to the frequent enquiry, why are the teeth of the present generation so bad ?" is told "to take the opportunity of giving words of warning to his patient, particularly when the questioner is likely to become a mother." What ought he to advise ? and what ought he to persuade his medical friends to do ?

Of loose grammatical construction, we may give the following examples :—

Page 390, line 28, "It consists of the administering of."

Page 369, line 32, "where the lesion is anterior," etc.

Page 350, "should teeth be present on either side" the context shows "both sides" is intended to be conveyed.

Letterpress and printer's errors, are also of frequent occurrence.

Page 60, line 20, "Inhibition" for "Imbibition."

Page 161, "In fig. 185 the way," etc., line 9 and line 12 "in fig. 186, on the other hand" etc., should be "186" and "187" respectively.

Page 372, line 14, "built up in" should be "built up on."

Page 372, line 19, "so as to form shallows troughs," etc., should read "so as to form shallow troughs," etc.

Page 373, line 10, "articulate" should read "articulation."

In the preface the authors announce their intention of using the term mandible for lower maxilla, but further on in the book this good intention appears to have slipped their notice, for on page 389, line 14, we read "temporo maxillary" for "temporo mandibular," also line 22, "pterygo maxillary" for "pterygo mandibular," and page 389, lines 33—34, "pterygo maxillary" for "pterygo mandibular."

We should have preferred to see, in one or two instances, fuller justice done to the labours and writings of others. In the chapter dealing with Fractures of the Jaws, we think that Sir John Tomes' name should have been associated with the method, mentioned on page 368, of procuring a "corrected model," which he was the first to describe.

Again in pages 184—185 and others, when speaking of amalgams and their qualities, mention is made of the interesting experiments of Mr. Kirby and others, whereas the excellent work of Mr. Charles Tomes, and Dr. St. George Elliott, on the same subject, are left unnoticed.

Page 212, in the description of porcelain inlaying by the rotation method, credit should, in our opinion, have been given to Dr. Howe, who first described and illustrated it.

There are a few subjects too, on which we seek in vain for the authors' guidance and opinions, and we think it would have increased the usefulness of the work, especially to students, to have devoted a few pages, to the following:

(1.) Cleft and perforate palates and their mechanical treatment.

(2.) Artificial substitution after operation on the maxilla or mandible.

(3.) The adaptation of artificial crowns and bridges.

Although this latter, we note from the preface, is pointedly

omitted, we are bold to think, that any practical work on Dental Surgery of the present day, should have contained some reference to the choice and adaptation of artificial crowns, operations which must always occupy an important share of every conservative dental surgeon's time and attention. A few well chosen words and directions also, as to the application and limitations of bridge-work, would, in our opinion, have enhanced the value of the work both to the student and practitioner.

We welcome the book as a pithy and practical work on Dental Surgery, and, with the few errors of omission and commission, we have noted, removed in a second edition, we can recommend it to our readers as a useful and valuable addition to the dental surgeon's library.

CORRESPONDENCE.

[We do not hold ourselves responsible in any way for the opinions expressed by our correspondents.]

To the Editor of the "DENTAL RECORD."

DEAR SIR,—Will someone kindly tell me how to extract roots (usually upper canines) that are so "funnelled out" by decay that it seems impossible to grasp the piece (usually about a third of the length of the root,) at the apex that is not sufficiently solid to be taken hold of with the forceps without crushing and failure to extract?

I have grasped the alveolus on both sides as high up as I was able to; have forced up one beak of the forceps as high as possible on the palatal side in the usual way, closing the other on gum and alveolus; have placed one beak on the hollow root, the other on the alveolus; have used the screws made for the purpose; have filled up the root with amalgam and operated the next day; have cemented a screw into the root, and have tried to get the end of the root out with elevators and with also the usual application of the forceps, and in ninety-nine per cent. of the cases have failed.

After much "mashing up" of alveolus the end of the root works down in time and can then be readily removed, but is there any means of bringing an operation of this kind down to the level of an ordinary root extraction?

I am, yours faithfully,

EXCAVATOR.

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PAIN.*

By Mr. J. MAIN NICOL, M.R.C.S.

WHEN asked, by our Secretaries, to read a paper before this Society, I felt the honour conferred by the request, great though it was, less than the responsibility it involved, the latter being augmented by the fact, that, having during the last fifteen months listened to so many papers, full of practical details, the work of my seniors and contemporaries, little of a special character was left me from which to select, and, having nothing original of any moment to communicate, the feeling that a more general and widely-ranging subject might not be unacceptable, coupled with a great personal interest in what I have chosen, and last, but in no sense least, the kindly suggestion of a friend and fellow student, led to my choice of "Pain" for your consideration, knowing, further, that a symptom, the relief of which forms such a large element in our daily work, could not but be of interest to you all. And if, as I fear, you hear much that is not new, or that does not accurately deserve the suffix, *algia*, you must pardon me on the ground that the same scene has a very different aspect when viewed from a new standpoint, and that a wide angle lens necessarily includes many peripheral rays which do not properly belong to the landscape. I must also offer some preliminary apology for the incompleteness and fragmentary character of my paper; as it was so obviously impossible to touch, even cursorily, on the whole ground which the title includes, I was compelled to limit myself to those points which struck me as most interesting, and in view of a comparatively small experience, to speak, even on these, suggestively and with some hesitation.

* A Paper read before the Students' Society, Dental Hospital of London.

I do not here wish or intend to consider pain in its wider psychological acceptation as the *affective colouring* or *hedonic tone* of our common sensations, nor even in its functional or neuro-mimetic form, but in its more limited application to any unpleasant sensation, local in origin, construed by the recipient into the expression, "It hurts." Now we are not so strictly trained, as an older generation, to regard every movement or process in nature as intended for a definitely useful purpose, but, that there is some subconscious desire to find this the case is evidenced by the number of workers endeavouring to find functions for those apparently superfluous organs, the thymus gland, the thyroid body, the hypophysis cerebri, &c., whose utility only appears pathologically in a negative manner, in much the same way as the traditional boy defined salt: as "the thing that made potatoes taste nasty when they hadn't any on them"; yet in pain the school of teleologists find an infinitely sounder argument than the disciples of Hahneman in their empirical *ignis fatuus* "*Similia similibus curantur*." You all know Hilton's law, "that the skin covering a joint, the muscles moving it, and the articulation itself are all supplied by the same nerve." By this association, a lesion of any one of these various structures is at once followed by a modification of function calculated to diminish the pain, and it is worthy of note that even when pain is unfelt (as in sleep), a diseased or inflamed joint is fixed in that position which would be easiest were the patient conscious. This law is well exemplified in the temporo-mandibular joint, whose nerves are derived from the fifth cranial (auriculo-temporal and masseteric branches), the masticatory muscles receiving their motor stimuli from the same source (deep temporal, pterygoid and masseteric branches), while the sensory branches of the trigeminal nerve almost monopolise the corresponding cutaneous area. And to digress a little from my text, the vascular arrangements exhibit a similar relational distribution; that (at first sight) aberrant branch of the internal maxillary artery, the great meningeal, if examined, will be found to supply and nourish the duro-matral or endosteal covering of those bones, and more richly those parts of them, from which the muscles of mastication arise.

Look for a moment at the teleological value of pain, as it occurs in connection with the teeth.

The acutely icy pain, which, in irritation of the pulp is often noticed when changes of temperature occur, leads the patient to

avoid a repetition of its appearance, and thus the removal of two potent agents in maintaining or increasing the morbid state. Again, in periodontitis, the pain in early stages, although it has the paradoxical effect of causing the patient to bite on the affected tooth, yet always prevents its use in mastication, thus giving the inflamed tissues a much-needed rest.

And, in exposure of the pulp from caries, if of some duration, it is not rare to see an extensive deposit of tartar on the teeth of that side, the result of their disuse, prompted by the salutary pain; that this is responsible for postponing the evil day cannot be doubted, for the usual history of acute inflammation of the pulp is, that while eating, a sudden pain was felt in the tooth, and gradually got worse, culminating in the typical painful sensations associated with the condition.

So that, from our own point of view *quâ* the patient, pain acts beneficially by causing a voluntary but half-conscious protection of the injured part.

Perhaps a still better illustration of this rest-producing power of pain, and a very apt example of Hilton's law (modified, it is true,) is afforded by the inability to open the jaws associated with, and the result of, difficult eruption of the lower third molar. In this condition the mouth is with difficulty opened a very short distance, and any attempt to increase the interdental space is vigorously opposed by the masticatory group of muscles. In rare cases, this opposition is reflex, but as under an anæsthetic, the jaws are usually easily separated, it must be believed that the pain, to which during consciousness, opening of the jaw gives rise, is the efficient cause of the trismus. It has been stated that trismus from an erupting wisdom is the mechanical result of inflammatory exudation into the muscles in the neighbourhood, more especially the masseter; the chief arguments in its favour being:

1. That clinical observation does not show a contracted masseter.
2. That the degree of trismus diminishes as the inflammatory symptoms subside.

But, although this infiltration is in a large number of cases beyond cavil, I wish to show that it affects the fixation of the part largely, if not entirely through the medium of pain, on the following grounds:—

(a) Experimental inflammation of striped muscle does not prevent its relaxation.

(b) Under an anæsthetic, as a rule, the mouth is readily opened.

(c) Although the masseter muscle is not tense when examined at rest, this is easily explained by the fact that the pressure on the inflamed tissues—the result of such a contraction—would be painful, and thus avoided by the patient, and besides, the muscle does become tense if any attempt to separate the jaws be made during consciousness.

(d) That the trismus subsides in proportion with the inflammatory symptoms is distinctly in favour of the pain view, as this last symptom equally subsides with the lessened inflammation.

The value of pain, *quâ* the surgeon, is not less marked, as an aid to diagnosis, and a limiting guide in treatment.

In diagnosis it assumes two forms, being either a *symptom* or a *sign*, and the latter is by far the more valuable.

As a *symptom*, it embodies the patient's sensations, which may be misleading, as they may be referred to a seat far distant from their origin, which indeed may be central.

As a *sign*, it is elicited by percussion, by pressure, by means of heated burnishers, and the hot or cold blast; it here finds an analogue in the tenderness of the general surgeon, and is used in the diagnosis of irritation, or chronic inflammation of the pulp. periodontitis, death of the pulp in a tooth otherwise sound, &c., &c.

In treatment it is always elicited, and in consequence always a sign; and its uses in preventing accidental opening of the pulp-cavity, drilling through the apex or side of a root, inserting a filling with too high a degree of thermal conductivity, are sufficiently obvious.

Pain varies greatly in severity, such differences being traceable to local and general causes.

Amongst the local factors, we must rank as most important the degree of tension, and the acuteness of the cause, these two not seldom varying directly as one another.

Concerning the latter, the marked difference between the pain of acute, and that of chronic pulpar inflammation, and the similar disparity observed in the subjective signs of slow-growing and malignant neoplasms are sufficiently obvious to require no comment.

As to the former—the degree of tension—the marked increase pain when pressure is made on a tooth in an advanced stage of periodontitis, the equally significant relief of pain when an alveolar abscess, perforating the bone, escapes into the yielding soft tissues,

and in general surgery the acute throbbing pain of a tensely-distended joint, and the sickening, almost unbearable pain of an acute orchitis are excellent examples, and it may be made an axiom that "the greater the resistance the greater the pain;" further, that tension renders comparatively insensitive structures, as tendon and ligament, exquisitely painful.

The general factors are practically embraced by the patient's constitutional condition and temperament.

The general health acts very noticeably, and obscure, neuralgic pains, apparently causeless—so far as a local examination can give evidence—are, in many individuals, a common symptom of lowered health; indeed, Romberg has somewhat poetically said, "Neuralgia is the prayer of the nerve for healthy blood." Probably such depressed health acts locally, and renders the nerve endings more susceptible to trivial irritation, but it also operates generally, causing the sensorium to magnify its impressions.

And the last factor is the temperament or personal equation, a most difficult and important matter. The most casual observer cannot fail to notice that there may be a wide difference between individuals in their capacity for bearing pain, quite independently of health, and it is essential that the dental surgeon should take cognizance of this, and in all operative procedures, consider it. Unfortunately there are no certain means of diagnosing the hyperæsthetic, and one usually recognises it only at the first operation. The treatment of this factor by gaining our patient's confidence, and a due exercise of sympathy, is of immense value, for the temperamental condition has power to modify sensations to a quite surprising degree. It is needless for me to say that at Leicester Square, such consideration is always shown, and the operator does not, in thinking of the tooth, forget his patient, but one has to be constantly on their guard to prevent this. I cannot emphasise too strongly the necessity for this consideration, as properly employed, it gives a patient enormous moral courage, enabling him to endure more painful—often a synonym for better—work. Such a feeling for the suffering individual is, I think, best ensured, if the operator pictures his patient's mental attitude accurately, and is impressed if he submits himself to some of the treatment he so freely administers to others. To him, the one-sided *face grippé* of Laennec, presented by the suffering man after forty-eight hours' toothache conveys more than the fact, that there is an inflamed pulp and alveolar abscess,

and leads to corresponding gentleness in treatment. And I cannot too strongly express my opinion that a man who, while making an exposure, or excavating sensitive dentine, laughs and jokes with another student lolling over his chair, is incapable of assuming a sympathetic manner with another patient; for these things are part of the man himself and represent, so to speak, his creed and practice "up to date." Of course, I am not now speaking of our own Hospital, and so really, some apology is necessary for introducing it. This consideration for the patient's feelings must not, however, lead to lack of thoroughness, but the two must be carefully balanced, and the final goal be "Wherever possible the best, and when impossible, not what one would, but what one can."

Concerning the general principles involved in the treatment of pain, I will be very brief, as I wish to refer to several special conditions. These principles consist in—

- (1) The removal of the cause, where this is possible;
- (2) The diminution of the peripheral stimulus by—
 - (a) The use of anodynes locally;
 - (b) The relief of tension, where it exists.
- (3) The diminution of the central impression by—
 - (a) Improvement of patient's general health, though this, as a rule, scarcely comes within the dental surgeon's province.
 - (b) Moral suasion and personal influence, particularly applicable to painful sensations analogous with tenderness, and produced by the surgeon's manipulations. In this connection, the truth of an axiom, from the old Philosopher and Emperor, Marcus Aurelius, is very evident, for he says (M. Aurelius, Med. Lib. IV., No. 7): "Do not suppose you are hurt, and your complaint ceases. Cease your complaint and you are not hurt."

And now to deal with a few specific painful conditions, and here I should like to suggest to my fellow students a more careful observation and noting of the results of systematically carried out methods of treatment: Sydenham was wont to say "*Ars tota medicinæ est in observationibus*," and although this does not hold as regards the adjective *tota* in the step-daughter (and I use the prefix advisedly) Dental Surgery, yet its importance is great, and in the present instance, for more accurate knowledge, vital.

And first, of Periodontitis; for the relief of the dull, constant aching, a comparatively fresh aconite leaf is most useful, I think;

its value is but little known, but its advantage over the tincture in greater strength and persistence are evident, and in many cases, and in my own person, I have found it alleviate pain greatly. The inflamed gum being dried, and a piece of leaf of suitable size cut, the latter is simply pressed into place, where, as a rule, it will remain as long as a capsicum plaster. Leaves may be kept moist by the use of a tin box, with well-fitting lid, in the interior of which is a damp sponge. In drilling into a tooth, the pulp of which is gangrenous, the pain caused by the vibratile pressure may be much lessened by passing a clove-hitch of silk round the cervix, and keeping up strong lateral tension during the operation. When the adjoining teeth can be utilized, osteoplastic or plaster of Paris, or modelling composition may also be employed to splint the affected tooth. These methods of steadying a tooth must be old to many of you, and yet I have rarely seen men employing them at our Hospital, at least for this special purpose. The rapid application of a silk ligature recommends the first method more than the remainder.

In *Pyorrhœa Alveolaris*, a common symptom of which the patient complains, is an itching sensation, short of pain, provoking a desire to rub the gums frequently; this pruritus, probably the result of the chronic gingivitis, has an excellent homologue in the intense itching of the common chronic superficial dermatitis, called eczema. And from the readiness with which the latter disappears under the use of unguents containing 5 to 10 per cent. of one of the essential oils (notably that of peppermint), I would suggest the employment of one of these, either in a mouth wash or tooth-brush tincture, or as a constituent of the medicament used in the treatment of the pockets. The essential oil contained in acid sulphuricum aromaticum is too small in amount to be a fair test. But I am anxious to hear from others, their views as to this symptom and its treatment.

Another cause of pain, for drawing my attention to which I am indebted to one of our Senior Staff, is a chronic inflammation of the pulp, arising independently of caries, in association with *pyorrhœa alveolaris*. The patient complains of sensitiveness to heat and cold in the molar region, and is usually unable to localise it with accuracy; on inspection, there may, or may not be, caries, but as the particular disease in question is quite independent of decay, we may for the present regard it as non-existent. On testing the teeth with the hot blast (and this is more efficient than a heated

burnisher), one of the molars, most usually the second, is found acutely sensitive, and if care be taken to limit the area covered by the hot blast, the pain may be localized to one side of the tooth, more commonly the buccal, while the lingual side is unaffected by thermal changes. If such a tooth be extracted, and split open, it will be found that the palatine root contains the putrid sphacelus of a gangrenous pulp, while, more towards the crown, will be found a bead of pus; the remainder of the pulp cavity and the buccal root canals are occupied by pulp, which, from its hyper-sensitiveness above described, and its now obvious hyperæmia, is apparently chronically inflamed. A zone of intense redness, microscopically indistinguishable from granulation tissue, bounds the inflamed pulp, and separates it from the pus. Probably the pathology was as follows: Gangrene of the palatine radicle of the pulp occurred, being either primary and a concomitant of, or secondary and denteropathic to, the periosteal inflammation of the more general pyorrhœa (whether this gangrene has a fraternal or filial relationship to the chronic periostitis can only be decided by a more accurate knowledge of the pathology of Rigg's disease); the sphacelus acting as an irritant set up a greater or less degree of chronic pulpar inflammation, aggravated, no doubt, by the impaired blood supply, which, in the palatine radicle, was diminished to such an extent as to cause death. A line of separation formed, as in gangrene elsewhere, at the expense of the living tissue, and the still remaining dead tissue causes a slowly progressive ulceration—for that is the actual fact—of the remaining pulp, the pus formed being the discharge from the ulcer.

The treatment of these cases would reasonably be on the following lines. If the tooth be hopelessly loose, it should be extracted. If the tooth be firm, or only slightly loose, or even very loose, and yet of value as a support to a denture, or for mastication, it should be retained and treated by devitalizing and extirpating the pulp. This is best effected by cutting a shallow retentive cavity in that side of the tooth insensitive to heat; a sharp rose-head may then be made to enter the pulp-cavity, probably in the region where pus is present, and so cause no pain; should, however, the inflamed pulp be wounded, the previous preparation of the cavity prevents a further use of the engine, of which a sensitive patient would be suspicious. The subsequent treatment by means of a dressing of arsenious acid, &c., is too well known to require description.

Since my attention was called to it, five instances of this partial gangrene of the pulp have come under my notice. In one of these the tooth was extracted, and precisely the condition I have described, found. In the remaining four, the twelfth-year molar was in each the affected tooth, and in each, the buccal wall was the sensitive one. In drilling through the lingual wall, sensitive pulp was in one case encountered, and I then felt the desirability of previously preparing a cavity to hold the arsenic dressing and gutta-percha. All did well, at least, shall I say, as long as they were followed, in each case several weeks.

Speaking of exposures, especially when the pulp is acutely inflamed, the removal of the leathery dentine is apt to be a very painful, and frequently is a lengthy process, and I have for some time adopted a more rapid procedure. In a case where extensive caries, or the symptoms of acute pulpar inflammation are present, or where pain on pressure by means of wool in the cavity, acute sensitiveness to heat and cold, slight periostitis and a history of sudden pain during eating, or of recurrent acute attacks with nocturnal exacerbations, indicate that the carious process has opened the pulp-cavity, I proceed in this manner (and am prepared for very adverse criticism on what is here advocated): First, cleaning the margins of the cavity and rendering it approximately retentive; remove any obviously loose carious *débris*, and then instructing your patient that he, or she, must bear a sharp, but quite momentary pain, with a sharp rose-head bur rapidly rotating, open the pulp-chamber. If the patient objects to bear a sudden momentary pain, nitrous oxide may be given, but is not often necessary. In acute inflammation of the pulp, the wide opening so completely relieves tension that it is usual to find an immediate cessation of toothache, and the gratitude of the patient for its disappearance quite outweighs the unpleasantness of making the exposure.

The advantages of this method are obviously many:

1. Its rapidity *quâ* the operator.
2. Its rapidity *quâ* the patient, shorter duration of pain.
3. Its large size, giving complete relief to tension, affording a ready application and a rapid absorption of the arsenious acid, so that patients rarely complain of pain during the death of the pulp.

Of its disadvantages I am fully aware, but would prefer some one else to take them up, that I may try and meet them.

In excavating the permanent teeth of children under twelve

years of age, it not seldom occurs that one or two intensely painful spots reveal themselves, without any sign of exposure of the pulp as indicated by redness or bleeding; this may also occur in the temporary teeth, but in them, so far as my experience goes, it is rare, sensitiveness of the dentine, when present, being more diffused, and any sharply localized sensitiveness being an undoubted exposure. Now, I am led to believe that in some cases at least, if not in many, these little sensitive points are really hair-like ramuscles of pulp, so fine as to be devoid, or almost so, of blood vessels, and consequently not revealing their nature by the more classical signs. An interesting case tends rather to confirm this view. A shallow, circular cavity in the labial wall of an upper incisor in a boy of ten, when excavated, presented one of these points, and I would emphasise the fact that the surface of dentine appeared perfectly uniform, and no one inspecting the cavity could distinguish one part of it as different in appearance from another. A minute drop of carbolic acid introduced on a plugger, accidentally retained its spheroidal form, and I noticed that the light reflected from its surface moved rythmically; the drop was in fact pulsating. On wiping out the cavity, no sign of such pulsation could be seen, and yet one must believe that the drop of carbolic acid was in actual communication with the pulp-chamber. This case was treated by capping with zinc oxysulphate, and did very well, and such treatment seems to be the most natural and scientific, for the conditions are peculiarly favourable to the formation of secondary dentine, as, from the absence of hæmorrhage, or sign of redness, it is fair to suppose that the cellular periphery of the pulp is comparatively intact, although, if the "biopiasson" structure described by Messrs. Bödecker & Heitzmann were correct, the integrity of the odontoblast cells should not be necessary.

In the treatment of root-canals, from which a recently living pulp has been extracted, the bristle occasionally detects a tender spot in the wall of the canal, and that this is not due to retention of the apical part of the pulp is shown by the fact that on pushing the bristle further, the tender spot is passed. The cause of this sensitiveness is very obscure; it has been suggested to me that it may be due to one or two odontoblast cells clinging in a group to the wall, but it must be remembered that they have now lost all communication with nervous tissue except through the medium of their fibrils which communicate with the ramifying processes of the

cement corpuscles, and considering that the dentinal fibrils possess the power of receiving and transmitting painful stimuli, it seems unnecessary to imagine a group of retained odontoblasts. That this communication between the periosteum and the dentinal fibrils through the medium of the cementum is sufficient in rare cases to effect the transmission of painful impulses was rendered evident by a case occurring to me about a month ago. An erosion cavity, typically "file-cut" into the enamel and dentine of a second lower bicuspid, was extremely sensitive, and yet the tooth was pulpless, for I passed a bristle quite to the apex of the root, and suspecting a second root containing live pulp, heated up the tooth, but without effect. A similar case is cited by Salter in his "Dental Surgery and Pathology." Sensitiveness, the result of exposure of the cementum from retraction of the gum, must not be confounded with this. Another possible cause for this condition is a vasculo-nervous canal going laterally to the periosteum.

The uncertainty of the cause is increased by the comparative rarity with which such a tooth is removed and examined; I have noticed it in some five or six cases, and in all the pulp had been devitalized by arsenic. I have been in the habit of filling the pulp-chamber with oxyphosphate, after merely drying the root canal, and never found any trouble follow.

I have to acknowledge the kindness of our Senior Secretary in showing me an upper bicuspid removed for pain on pressure, as during mastication, the pain being of a pricking character, and independent, I understand, of any periostitis; I regret that I do not remember whether the tooth was carious or not, but if it was, the decay was slight; the remarkable feature was that its single root, which was of quite unusual length and tortuous, terminated in a very sharp point. It seems reasonable to suppose that the length of the root and its consequently more gradual taper rendering the socket less conical, allowed a kind of piston movement in the tooth, so that each impact of mastication drove the sharp point into the osseous tissue of the jaw, causing the significant pain. Could this condition have been recognized prior to extraction, a matter of grave doubt, the treatment naturally suggesting itself would be excision of the apex, after cutting through or trephining the alveolar wall; but, even if the diagnosis were certain, the operation would be as much the converse, from the difficulty of ascertaining the precise position of the apex; in this instance, the root was so irregularly

curved that the finding of its apex would have been quite a problem in the mathematical theory of probability.

One more cause of pain, with which I am going to bore you, and I have done. I refer to exostosis or hyperostosis of the roots of teeth. The pain is sometimes suggestive of a periosteal, sometimes of a pulpar lesion. After extracting exostosed teeth, dentinal concretions in the pulp-cavity are sometimes found, but as these occur in perfectly sound teeth, with no history of pain, and are often discovered accidentally on splitting open a tooth removed for purposes of regulation, their presence has no influence either way; a theory commonly accepted is that the compression of the alveolus by the increased size of the root, and the consequent injury to its nerves, is the potent factor. Against this it may be urged that when the alveolar bone is expanded or compressed by the growth of a tumour or cyst, the pain is comparatively slight, as compared with that in exostosis, and when the relative sizes are compared, the disparity is enormous. A more credible hypothesis would seem to be that the irritated periosteum—for exostosis is usually regarded as a hyperplastic or osteogenetic periodontitis—has, in the stimuli conveyed to its nerve endings, an efficient cause of pain. But to prove the truth or otherwise of the belief in alveolar expansion and compression, would not some experimental work of the nature of linear osteotomy, say for instance, cutting through or trephining through the alveolar plate—outer or inner, whichever were thinner—be of value? In condensing or sclerosing osteitis in the larger bones, similar operations on a larger scale are attended with much relief, and treatment at present, by the internal administration of drugs, and local counter-irritation usually produces so little result that extraction follows. I would be very glad if any one can tell me whether in a dead tooth removed for pain independent of septic periodontitis, or alveolar abscess, the roots were found exostosed.

And now I have done, but to those of my fellow students who are interested a little beyond our own sphere, in the subject of pain, may I recommend Mr. Bryants' "Hunterian Lectures on Tension, Inflammation of Bone, and Head Injuries," and those two surgical classics, Sir Charles Bell's "Anatomy of Expression," and Mr. John Hilton's "Rest and Pain." And, as it must happen to some of us, that after qualifying, we have for some time to enjoy the prospect rather than the fruition of professional success, might I suggest that the causation and pathology of sensitiveness in dentine afford a wide

field for original research, and the man who conquers this *bête noir* of the dental surgeon will earn for himself a well deserved fame in the professional world.

Again, I must ask pardon, as I have already once done, for the fact that I have often appeared to be stating as somewhat novel, things which are well-known and almost commonplace. It was impossible from the nature of the subject to avoid this, and my ambition is amply satisfied, if I have been able in some measure to clear up the uncertain, to rescue the falsely dogmatic from a parasitical veracity, and to emphasise what is true. There now only remains the pleasant duty of thanking you for the kindly attention with which you have honoured me.

PRESIDENTIAL ADDRESS.*

By CLAYTON WOODHOUSE, M.R.C.S., L.D.S.

GENTLEMEN,

My first words must be of thanks to you for the honour you have conferred upon me in electing me as your President for the current year.

When I contemplate the list of names of those who have occupied this chair in past times, I feel a strong sense of misgiving, and I am only consoled with the thought, that the responsibility of my position rests entirely with you and your Council. For my part I can only promise to fulfil the duties of President to the best of my very limited ability.

I have thought it well to say a few words to you to-night on the subject of our profession generally, before speaking about our own particular Society; and this I do, because, in casting about for a subject to speak to you upon, I realized how seldom it is, that dental students have any opportunity of having any general advice offered to them. Not that advice goes for much, nor am I in any way qualified to offer it, but I thought it possible that a few general remarks made at such an impressionable time as that of a student's career at the Dental Hospital might be of some slight assistance in making him step back, as it were, from his work for a moment and take a wider view of his position and the possibilities of his Profession. To any thinking man, who is preparing himself to become a member of our Profession, there must come, at times, moments of

* Delivered before the Students' Society of the Dental Hospital of London.

depression and sickness at heart when he contemplates the methods adopted by certain classes of practitioners and the means employed to make their calling and occupation known. The Medical Profession, generally, has shaken itself free from the quackery and abuses of a by-gone day. And in our particular branch much has been done by noble and self-sacrificing men in the past, to raise the Dental Profession out of the slough of despond, in which for a long time it lay. All honour to those men ! they have laboured, and we younger men have entered into the fruit of their labours. But, gentlemen, much remains to be done in the future, and who is to do it ? You gentlemen, and such as you, are to a large extent, the hope of the Profession.

It is only by slow degrees and by gradually educating the public, that an improvement can be hoped for in the tone and status of the Profession as a whole. There are, I believe, roughly speaking, on the books of our school at the present time a hundred names of students who, in the course of a few years, will be dentists in active practice, dotted about in various parts of the Kingdom. What I want you to realise is, that each one of you will be a centre from which will radiate certain impressions, which will influence the minds of the public as to the Profession to which you belong.

To bring this a little more vividly before your minds let us take a simple calculation. Say that each one of these one hundred practitioners, in a few years time sees five patients a day; not a large estimate, I think you will agree. That will give us five hundred patients in a day, and in a week, three thousand people, who have come into contact with young members of the Profession of dentistry. Nor is that all, for every one of those three thousand will have their friends with whom they will talk over the experiences of their visit, and who will be sure to ask, if it is a first visit : "What is he like ?" and from the description given, they, and probably others, will form their opinion of the rising generation of dentists.

I will not elaborate this idea further, but, from what I have indicated, you will easily perceive how far-reaching may be the influence of one generation of young practitioners upon the impressionable British Public.

What, then, should we wish people to say of us, when they look at the rising generation ? Not what an old lady said to a young one when she was told that the young lady was engaged to be married to a dentist "Well, my dear, 'tis a very useful trade." We hope for a

better verdict than that. But that can only be obtained by each one of the younger generation determining that he, at least, will act with true professional spirit, and will, in his own practice, seek to raise the tone of his Profession in the minds of his patients.

I cannot impress too strongly upon you the fact, that from the attitude and behaviour of each one of you in the future, a large number of your countrymen will judge of the status and tone of our Profession. Every indication points to the fact that the dentist of the future will be more and more an important personage in the every day life of the classes, whose good opinion is the most valuable. It behoves us, then, to see that the supply is adequate to the demand; not only in quantity, but, what is more important, in quality.

I cannot here go into all the qualities which are important in a dentist, many are obvious, but one above all is important, and that is conscientiousness.

A gentleman, who had suffered many things in pocket and in other ways, from a certain class of dentists, said to a friend of mine, "I go to Mr. So-and-So, because I believe he has a conscience."

If you do your work conscientiously, though the results may be slow in appearing, you may be sure they will appear in due course, and, at any rate, you will have the satisfaction in your own mind of feeling you have done your best.

I suppose that, of all professions, ours is the best hated; but at least, if we cannot win our patients' love and regard, we can earn their respect. All of you, I take it, wish some day to become successful practitioners; and, to be that, many qualifications are necessary. I have spoken of the very important need of conscientiousness, I may mention one other, and that is sympathy. The students of the present day, and rightly, commence their operations upon blocks of ivory or bone, and sometimes I have thought that there is a tendency manifested among some of our students to regard their patients as only rather larger and more inconvenient blocks of ivory or bone, and to treat them accordingly as such. That tendency should be checked, and an attempt made to cultivate a good "chairside manner" which in its kind, is quite as important and useful as a good "bedside manner" to a medical man. We must bear in mind that our patients, in private at any rate, come to us in fear and trembling, and a little sympathy will go a long way towards putting them into a calmer frame of mind, and will in the end, help us much in our ministrations towards them. This especially

is the case with children, who, after all, are the future of our practices, and it is better to do little or nothing at the first visit, except endeavour to gain their confidence. Children never forget their first visit to the dentist, and if we take them by surprise or give them pain without warning, we may give them an impression of horror which they will never forget. Now let us leave these considerations and turn to our own Society.

Such a society as this is peculiarly an English institution. From the earliest days English people have formed debating societies, and societies for discussing every conceivable kind of interest. Dinners and debates have their roots deep down in the conservative instincts of English people.

The importance of such a society as ours does not need very much insistence from me. Our society is, I believe, one of the oldest of its kind in London, and though that, in itself, is not necessarily a great recommendation; yet if it keeps itself level with the times, or, better still, slightly in the van, its age gives dignity to its proceedings and weight to its utterances.

The social advantages of such a society as ours are not to be despised, for it brings men together of all grades, of various schools, and acquaintance are made, and friendships strengthened, when meeting in friendly council or debate.

But it is from its educational point of view, I imagine the greatest benefit is likely to accrue to those who are regular in their attendance, and who take part in the discussions which follow the papers. The mere fact of getting up a subject sufficiently to be able to deliver a paper upon it, requires very considerable reading and thought upon the matter, and this will deepen the knowledge of the inquirer materially, and will be sure to lead him further along the flowery paths of study, with the result that his mind will receive a stretch in that direction, which will make it, by that much, more receptive to other impressions.

A more practical benefit which a student may receive is the accustoming himself to the sound of his own voice in public. There are doubtless a few men who do not know what diffidence or shyness is, but I am sure that the large majority have to go through a good deal when they first rise to their feet and endeavour to express their thoughts in the most elementary way. Such an opportunity, as the discussions of this society afford, is simply invaluable for the acquiring the rudiments of the art of public

speaking, and I strongly urge all, even the most diffident, to make up their minds to speak occasionally, if it is only to ask a pertinent question. You have a great chance here, and I would advise you not to allow that to be said of you, which a celebrated surgeon gave as a testimonial to a student, who had asked him for one. "Mr. So-and-So," said he "has had unprecedented opportunities."

Another aspect of the usefulness of this society is the scientific knowledge which students are able to acquire, by preparing or listening to papers on their own speciality. Though students at the hospital can hardly be expected to make any very great or startling discoveries, yet they can, if they choose to take the trouble, begin a series of observations, which, if extended over a number of years, could not fail to be, at least, most interesting, and, possibly, really valuable. Supposing, for instance, one of you to morrow morning were to begin to take notes of all the cases he saw in the extracting room on some such apparently trifling and inconsiderable question as the condition of the upper lateral incisors, in the class of patients which are usually seen at this hospital. He might be able to compare the number of cases of congenital absence or malformation in this class, with the same number of cases in a class of a higher grade when he is in active practice.

In this way valuable facts might be made out as to the probable date of the fulfilment of part of the prophecy, that in a few generations English people will be toothless and hairless.

This is, of course, only an example; numbers of interesting points could be suggested for watching, and the opportunities are so much greater at the period of a student's career than they ever are again. Other points might be named, as the disappearance of the wisdom tooth, in connection with the decadence of the lateral incisor; the condition of the six year old molar, etc., etc. And if our imaginary student continued his observations until he were ripe to become President of the Odontological Society, he would have gathered information enough upon his point of interest, if not to become a Fellow of the Royal Society, at least to be able to bring forward a most interesting and valuable monograph, which would find a place in scientific text books, and he would be quoted as an authority on his subject.

Gentlemen, I must bring my rambling remarks to a close, and in doing so will just touch again the note which I sounded at the

commencement of my address. There is a song which, I believe, is sung at the end of term at Harrow, called "Forty years on." That is a long way to look ahead, but I believe it is well sometimes, in spite of Charles Kingsley's advice, to take long views of life. What do we hope for "forty years on" for our Profession?

Surely we hope, among other things, that though by that time, judging from the trend of events, we shall be importing nearly everything from Germany or America, yet in our own line, we hope that English Dentistry will have more than held its own, and that, thanks to the rising generation of dentists, people will have learned that there is no longer need for the invasion of American Dentists to teach us how to do our work, but that from the great school of English Dentistry which will have its home in the noble building which will then have long been completed on the south side of Leicester Square, hundreds of hard-working, zealous, and well-educated dentists will have gone forth, bent on shewing by their life and practice what an honourable, useful, and scientific profession that of English Dentistry can be.

REPORTS OF SOCIETIES.

THE ODONTOLOGICAL SOCIETY OF GREAT BRITAIN.

THE First Meeting of the New Session was held on the 5th ult., the chair being occupied by the President (Mr. F. CANTON), who was supported by a full attendance of members. The minutes of the previous meeting were read and confirmed.

Mr. STORER BENNETT (the Curator), on behalf of Mr. Norman, one of the students of the Dental Hospital of London, presented a specimen of dilaceration of a right upper central incisor, which was of considerable interest. The injury was caused when the child was only two years of age. He had a habit of reaching up to a table, or anything of the sort, to see what was on it, and on the occasion of the accident he slipped, cutting his lip with the temporary teeth, and necessitating the sewing up of the lip. As time went on, the tooth referred to was seen to be considerably damaged, and at the age of sixteen it became necessary to extract it. Mr. Bennett drew attention to a fact worthy of notice, *viz.*:—that

an exceedingly slight amount of damage had been done to the succeeding portion of enamel.

The PRESIDENT then read his Inaugural Address.

His first duty on taking the chair was to acknowledge the honour conferred upon him, and to assure them that his best endeavours would be used to promote the welfare of their old and honourable society. Some short time since, when present at the Annual Dinner of the Harveian Society, the President of that body stated, that there were no fewer than twenty-eight medical societies, while another speaker the same evening explained his not being a member of the Harveian Society by the fact that there being only six evenings in a working week, all of which were already filled up, he had no evening available for attending their meetings. This at any rate was not an excuse which could be urged in their branch of the profession, for, excluding student's societies, there were only two dental societies, *viz.*:—the Odontological Society and the Metropolitan Branch of the British Dental Association. The former now confined itself exclusively to science, and the latter combined science and dental politics. Mr. Canton then proceeded to develop his views as to popularising the Odontological Society. He urged that their evenings should be made as interesting and instructive as possible to the generality of members, and was not sure that it would not be a good plan to follow the course pursued by many other societies, *viz.*:—to establish an annual dinner. By so doing they would be able to bring their society more into notice, and in this way probably increase their membership. It was his intention during his year of office to bring this question before the Council. He should also much like to see the society in more commodious rooms, though for many reasons he should be sorry for it to separate its connection with the Dental Hospital. The principal things to keep in view, in whatever changes took place, were, that they should have a commodious and comfortable meeting-room, reading-room, physiological laboratory, suitable home for their museum, and library, and he might suggest a smoking-room. It should be remembered that a society like theirs did good not only by disseminating knowledge, but by facilitating social intercourse in bringing members of their profession together, so that they might know each other better and thus strengthen the profession as a body. The Odontological Society was in a manner the guardian of the true professional spirit which they desired to see more and more

permeating their ranks. Its bye-laws strictly suppressed all unprofessional methods, and it would do much to confirm and support members, more particularly the younger members just commencing practice, in their honourable resolves to carry on their work in a truly professional manner, avoiding all trade methods, fascinating though such methods might be as an easy road to wealth. He believed their total membership at the present time was 367, and in view of the number of good practitioners there were in the United Kingdom, he did not think that this number could be regarded as satisfactory. He had heard it said that their subscription was too high, but he could not believe that this was a deterrent, seeing that the "Transactions" was included in the amount, and they were not—like their medical friends—called upon to subscribe to many other societies. With reference to the programme of the session, he was of opinion that most instructive evenings could be passed by discussions on ordinary subjects arising out of their daily practice, and he proposed to adopt this course, whenever short of a paper, instead of going outside their ranks for help, for while fully appreciating the readiness and kindness with which their medical friends came forward, he nevertheless thought, that unless such papers had a direct bearing on their speciality, this society should be able to provide plenty of interesting matters from among its own members. He should be very glad if individual members of the society would not wait to be asked, but would suggest to him any subject for discussion that they thought would be of special interest, and with the help of the secretaries he would then endeavour to organise a good discussion on whatever subject was selected.

Mr. WILLIAM HERN related an interesting case of "Multiple Dentigerous Cysts," occurring in one patient, a boy aged nine. He said the case was interesting both from its rarity as well as from other collateral points. The little boy was first seen in February, 1893, by his colleague Mr. Matheson, and he regretted that he was not present that evening to give his own account of the case. Mr. Matheson transferred the patient to Mr. Hern for surgical treatment in the Middlesex Hospital. When first seen the right side of the face showed marked bulging in the molar region, there was also some swelling of the left side of the face, but not so marked. On examining the mouth, a fluctuating painless swelling was observed occupying the right alveolar region above the teeth, the swelling

extended from the right central incisor to the region of the first molar, and was as large as an elongated pigeon's egg. On the outer surface of the left alveolar ridge another painless fluctuating swelling could be detected about the size of an almond, this swelling was situated about half-an-inch above the teeth on the outer alveolar surface. On passing the finger backwards from this swelling, two or three hard bony prominences could be felt, suggesting to the touch, the cusps of unerupted teeth. The teeth present in the upper jaw were, right and left permanent central incisors, the right and left temporary lateral incisors, right and left temporary canines, first and second right upper bicuspid, and first right and left permanent molars. On examining the lower jaw a small elastic fluctuating swelling as large as a flattened Barcelona nut was also found occupying the front surface of the alveolar on the left side, between the left permanent lateral incisor and the left first temporary molar in the region of the unerupted canine tooth. It was decided that it was a case in which surgical interference was desirable, and the lad was taken to Mr. Pearce Gould, who was present, and who would kindly tell them the nature of the operation he suggested and carried out. The cysts were opened by Mr. Pearce Gould in the floor of the right upper cyst, a lateral incisor tooth was found lying almost horizontally, and with its crown directed forwards and outwards, it was decided to leave this tooth and give it a chance to erupt, the right temporary lateral incisor was extracted. On opening the left upper cyst, a lateral incisor tooth was seen deeply placed with its crown projecting through the roof of the cavity in an almost vertical direction but with a slight backward inclination ; this also was left. Mr. Hern took models of the mouth and the teeth as situated. The small cyst in the lower jaw on the left side was not touched. The patient was seen a day or two ago (a year after the operation), and the incisor tooth, which had been left in the floor of the cyst on the right side, was erupted to the extent of one-third of its crown, but its direction was so horizontal that Mr. Hern thought it advisable to remove it. The tooth was placed in its position on the model taken last year, and a plaster cast procured ; this was shown.

Mr. HERN mentioned the following points of interest in the case, Firstly, the cysts were multiple : as far as he was aware no previous case of multiple dentigerous cyst in the human subject had been recorded ; indeed the statements made in text books was that they

were always single. Secondly, the bilateral symmetry of the cysts in the upper jaw: the cysts on each side occurred in connection with the permanent lateral incisor tooth—it was interesting to note that Mr. Sutton has noticed this bilateral symmetry in the lower animals affected by the same pathological condition, notably in goats. Thirdly, the mischief caused to the jaw and teeth by these tumours seemed to be in proportion to their depth from the surface and contiguity to a pre-existing cavity, like the antrum to which they could spread, the cyst, occurring in the lower jaw, having come to the surface and burst, was self-cured without any disturbance to the left permanent canine with which it was connected, that tooth having, as shown in the model, assumed its normal position in the arch; whereas the pressure of the expanding cyst on the developing left bicuspid had led to such deviation in their direction that the crowns were pointing inwards, and their buccal surface opposed to the bite of the lower teeth. Fourthly, the models of this case taken a year apart, showed an interesting fact in regard to eruption, *viz.*: that a tooth which has been disturbed in the jaw, having been bared to five-sixths of its length and one-half of its circumference retains nevertheless a tendency to erupt; the left permanent lateral incisor which was seen in the first model embedded in the floor of the cyst was in the second (taken twelve months after,) moved forward nearly half-an-inch and erupted to the extent of half its crown.

Mr. PEARCE GOULD explained the nature of the operation; the mucous membrane was cut, and then the cyst wall was opened. The cyst was not enucleated in a body, but in several pieces. The same method was followed with the next larger cyst. When the first cyst was opened, the permanent lateral incisor was at once observed lying horizontally, and deep in the cyst, as shown in the model. The points of the case which interested him as a surgeon, and he spoke with all humility before a society of dentists, was the fact that the wound had healed up notwithstanding the tooth was not removed: he had always been taught that the proper treatment of dentigerous cysts was to open the cysts and remove the teeth. His own feeling was, in every case where possible, to remove the cyst wall, and this he did in this instance, and he might say that in spite of leaving the tooth there the whole cavity healed up. The same thing happened on the left side, but there was this difference, that on the right side the tooth had erupted, while on the left it had not yet done so.

Then the smallest cyst of all, which he left alone, entirely disappeared when the tooth had erupted. The question occurred to him, how far nature might be left to do its own beneficent work in some of these cases.

Mr. F. J. BENNETT had been extremely interested in hearing of the progress that had occurred in the case just narrated. He remembered seeing it when Mr. Hern first commenced his treatment, and he might say he was a little sceptical as to any satisfactory result from trying to save the teeth. The course which Mr. Hern had adopted was the very essence of conservative treatment, and he was heartily to be congratulated upon the happy result. Mr. Bennett supposed that he proposed to regulate the teeth? Mr. Bland Sutton in his classification of odontomes took a very broad view, and proposed to include the soft tissues which went to form any part of the tooth structure; he had also applied them to the multiple contents of a cyst broken up by the pressure of fluid, and thus becoming a series of denticles. Mr. Bennett thought if they were to include these as odontomes they ought to include all retained teeth, because there was no hard and fast distinction between a retained tooth and a dentigerous cyst containing a tooth with a large amount of fluid.

Mr. STORER BENNETT mentioned some cases bearing on the subject of superior protrusion, projecting upon a screen lantern slides of the models taken of these cases in their various stages, together with photographs of the patients at different ages. He said that some ten years ago he had under his treatment in the Dental Hospital of London, three patients, two brothers and a sister; the boys were aged 12 and 11 respectively, and the girl 10. They were then suffering from extreme abnormality, but derived considerable benefit from the treatment they received in the hospital. Ultimately they passed from under his observation. About a year ago a child was brought to him who turned out to be the younger sister of the family he had just been referring to, treated ten years previously. He was so interested in the fourth child that he induced the mother to bring his former patients to him and let him see the condition of their mouths and take models of them; he also induced the parents to hunt up some photographs of the children from the age of six downwards. He thought they would be valuable, as by looking at the teeth carefully they would be able to trace certain peculiarities about the face which might be of value in guiding

them as to the treatment to be adopted before the crowding took place, so as to prevent the abnormality occurring, or at any rate occurring to so great an extent. This family was interesting because the protrusion affected the paternal grandfather, but had not affected any other members of the family until these children, so that it was a case of heredity which had jumped one generation. It had been suggested that in cases of this kind the first temporary molar should be removed and a strong pair of forceps thrust into the alveolus and the first bicuspid extracted. It appeared to him that if they could predict that superior protrusion was almost inevitable in the mouth, it would not only be justifiable but advisable to remove the first temporary molar and also the first bicuspid, to prevent the malformation, which was so difficult to cure.

Mr. F. J. BENNETT, speaking on the same subject, showed models of two patients, one aged 30, and the other 83. The first model was taken with the plate *in situ*, and showed the amount of forward movement of the upper centrals. This case was further interesting from the fact that this patient was underhung, and therefore the usual predisposing cause of protrusion was absent. In the second case the patient had lost all the back teeth, and the lower incisors bit on the hard gum behind the upper incisors and had driven them forward.

Mr. J. F. COLYER mentioned a case of extensive destruction of the teeth owing to the occupation of the patient. He said that about a month ago a patient came to that hospital who was a confectioner by trade, his duty being to test sugar boilings. His method was to stir the composition, taking some of it out and testing it between his teeth, whether it adhered to the teeth or whether it did not deciding the point as to whether it had arrived at the proper condition. The patient was in attendance for examination by the members, and the very considerable destruction that had taken place might be seen. All the teeth started by going at the gum margin, and they then fell off. One rather interesting point was that they appeared sliced off and not as in caries. Another point was the decay was quite hard, and was, in fact, what they would call "arrested decay." About the same time he saw another confectioner, in whom the decay was taking place in an exactly similar manner.

Mr. GEO. BRUNTON exhibited a selection of carborundum points, hones, and wheels, speaking very favorably of the material and describing its composition and manufacture.

Mr. H. BALDWIN opened a discussion on

“IMMEDIATE ROOT FILLING.”

He said, the question which arises at the outset, in the consideration of the advisability of Immediate Root Filling, is as to the nature of the objection which is raised against it. The objection commonly urged against it is that pericementitis in some form is more likely to ensue, or become uncontrollable, after immediate root-filling than after root-filling, which has been preceded by previous treatment. In order, then, to pave the way, it seems necessary to state the nature of this pericemental inflammation, and the manner in which its causes come into operation. Everything seems to show that the pericementum primarily becomes inflamed by absorption of some of the products of putrefaction, and some of the micro-organisms which cause putrefaction, both of which previously lodged within the pulp-canal; and that it may be kept up by the micro-organisms thus absorbed, living and proliferating within the pericementum, and thus supplying fresh quantities of toxic material. For this absorption primarily to take place, it seems to be necessary that these putrid products and organisms should come into actual contact with the pericementum at the apical foramen. Virulently putrid material may be lodged in the pulp-canal without any irritation of the pericementum, provided that it remains entirely within the canal, but if any force intervenes, which displaces some of this material out of the end of the root into contact with the pericementum, inoculation may be effected and inflammation set up. There is nothing to support the idea that the pericementum can ordinarily be infected through the substance of the dentine and cementum, in fact the channels which unite the dentinal tubules with the canaliculi of the cementum are so exceedingly minute that the tooth substance may here be regarded as a solid wall, effectually barring the progress of irritant matter, excepting in those rare cases where pathologically large channels run transversely between the pulp-canal and pericementum. It might be objected here, that if this theory were sound it would be always safe to fill a tooth with putrid pulp-canals at once, without removing the putrid contents, provided no force were used which could displace any of the putrid material into contact with

pericementum. This treatment we know is unsuccessful in practice. The inflammation, which follows, is probably to be explained not so much by pressure of malodorous gas upon the pericementum, though the gas would inevitably collect under pressure, but by some of the putrid material being forced into contact with the pericementum by the pressure of this gas. This seems especially likely when we consider that the gas would be generated throughout the mass of the putrid material, and chiefly at the end of the root furthest from the apex, where the putrescent material would be in greater quantity, and the gas from which would be in a better position to project a quantity of the poison against the membrane.

Now as to the claims of immediate root-filling :—

Its advantages:—1. It is obviously a great advantage to both patient and operator to be able to immediately and permanently fill a root, with the certainty of success, in the case of patients who cannot give another sitting.

2. It is obviously a saving of time, as there is but one fixing of rubber-dam and there is no time lost in placing and removing unnecessary dressings.

3. It is an advantage to plug the apical foramen as soon as safe to do so, as the pericementum is thereby safe-guarded from sundry forms of irritation, not the least of which are sundry pricks inflicted upon it by nerve-bristles, and again, the alterations of tension, which the insertion and removal of wet wisps of cotton wool inevitably produce when they fit the channel more or less tightly, as they generally do, and so act as a piston.

4. In addition, are the collateral advantages of inspiring a perfection of manipulation and a thoroughness of procedure, which are of great value. It is only by very delicate and thorough treatment with regard to the removal of putrid material, the avoidance of displacing any through the apical foramen, and the gaining of thorough and direct access as far as possible to all parts of the canal, that success is at all likely to be attained.

Its disadvantages:—Provided there is perfect safety in it there are no disadvantages in immediate root-filling. The advantages however are considerably lessened by the facts, that its perfect safety is in all cases unfortunately doubtful, and that there is usually an insufficiency of time during a first sitting to carry through all the processes of opening up, cleansing and filling the cavity of the pulp-canal and the cavity of decay, and, again, by the

facts that a trial dressing takes up but a very little extra time, provided the patient has to come again, and that if followed by serious inflammation the consequences of immediate root-filling are very sad. It may be noted here that if, as usually happens on a first visit, there is an insufficiency of time to carry through all the processes incidental to the treatment of a dead and putrid tooth, it is advantageous that all the preparation should be done on the first day and all the filling on the next, if no inflammation of a threatening character has intervened, as by this means the tooth is tested, and very often one thorough drying and application of the rubber-dam suffices, *viz* :—that which has to be done for the fillings.

Now, an enumeration of the *dangers* of immediate root-filling.

1. When introducing a nerve-extractor or nerve-canal drill into a root which contains putrid fluid it is exceedingly likely that the tension so produced will displace some of that putrid fluid into contact with the pericementum, or even quite through the apical foramen. The immediately subsequent attempt at disinfection may fail to neutralise the activity of this poison and a painful inflammation may be set up, which, if the canal is immediately filled, cannot be directly treated nor pressure relieved ; while the converse is the case if the root-filling admits of easy removal. The danger in this direction would probably be greater in the case of those teeth which were affected by incipient pericementitis at the outset of the treatment, as here the membrane would be of lowered resistance and more prone to become acutely inflamed.

2. When roots are causing abscess without “fistulous” opening there may be a considerable potential cavity in the jaw eroded by the ulcerative process of the abscess. In many cases it will be impossible to thoroughly sterilise and evacuate this cavity by one operation, and then immediate root-filling will result in an aggravation of the symptoms, if indeed any symptoms previously existed.

Again, supposing that an abscess cavity *can* be sterilized but that it remains full of pus when the root is filled, then the best that can happen is that the pus may become inspissated and represented by a cheesy mass. Mr. Lawson, in a clinical lecture, was once very emphatic in declaring that in his opinion not one drop of pus in this world had ever been absorbed, but that all cases of seeming absorption of pus were really cases of inspissation. It may be argued that there is no objection to a cheesy mass, but this is not so,

as inflammatory changes are more likely to ensue in after-time in the neighbourhood of such a dead deposit than at a spot more normally conditioned. In the opposite method of treatment, *viz.* :—the treatment by dressings, the pulp-canal is left to drain, and antiseptics are introduced at intervals into the canal, and, if possible, pumped through into the potential cavity. Thus the potential cavity becomes more or less rapidly obliterated by the general shrinking together of the inflamed and expanded tissues if the case be acute, or by the formation of granulation tissues if the case be chronic. In all other parts of the body this is the accredited and most generally successful method of treating abscesses, *viz.* :—to combine drainage with disinfection and so ensure the cavity healing up from its base. Thus it is seen that where there is practically an alveolar abscess-cavity in the jaw immediate root-filling runs counter to all the ordinary acceptations of surgical theory and practice.

Now, as to *General Rules*. In every case the canals should be opened up thoroughly and vertically, preferably with German screw-cut burs for the crown, and conical burs for the mouths of the canals, until instruments can be readily introduced into all the canals without bending. A good filling for pulp canals should be solid, unirritating, antiseptic, and removable, and should fill up the whole length of the canal. For reasonably safe roots I prefer as a root-filling a stiff solution in chloroform of gutta-percha and hydronaphthol, plus a sufficiency of cotton-wool fibre to carry it into place, and gutta-percha points where the canals are large. This is easy, penetrating, antiseptic, non-irritating, permanent, solid, and can always be removed with a blunt-pointed nerve-canal drill. For canals which are not considered very safe ones, or which cannot be followed far, owing to curvature of the roots, I recommend a root-filling of a mixture of hydronaphthol, eucalyptus oil, and French chalk on a wisp of cotton wool. This mixture sets into a crystalline mass, but, at the temperature of the body, is not too stiff to prevent its being drawn clear away from the canal at will. It is highly antiseptic, and quite unirritating. In a bottle it becomes hard, and has to be melted by heat before it can be used, but when melted remains fluid for a convenient length of time.

CLASSIFICATION OF ROOTS FOR ROOT-FILLING.

1. Aseptic roots. As where the nerves have recently been killed with arsenic, or have recently died from acute inflammation, and so have never contained putrid material.

2. Septic roots without complications (gumboil or abscess).
3. Septic roots without gum-boil, but with abscess.
4. Septic roots with gum-boil.

1. *Aseptic Roots*.—These should be filled as soon as the nerves are thoroughly removed, bleeding ceased, and the canals clean, provided there is no arsenic-irritation. If there be, the canal should be left freely open to the saliva until all tenderness has passed away.

2. *Septic Roots without Complications*.—First remove any solid particles of decomposing nerve, or other solid matter, from the canal by means of a fine new barbed nerve extractor, introducing it little by little, and meanwhile frequently withdrawing it and cleaning away from it any engaged particles. This is to prevent, as far as possible, any pumping caused by driving up any piece of solid matter. Then thoroughly dry out, with numerous wisps of dry cotton on fine bristles, all the fluid contents of the canal. This is emphatically important, and should be thoroughly done before any fluid antiseptic is introduced into the canal, as removing the most efficient cause of inflammation. Next pass a fluid antiseptic as far as possible along the canal on a fine wisp of cotton. The antiseptic recommended is mercuric perchloride in alcohol 1 in 1,000, or pure carbolic acid. Next, except in the case of unusually large canals, carefully drill out the whole length, whenever possible, of the canal with sterilized probe-pointed Gates' drills, only advancing along the terminal part of the root with a very fine drill and always avoiding excessively big drills. When using these drills always keep the engine running fast and press them only gently; never let the engine stop while the drill is in the canal. Now must be decided the question of whether the canals shall be immediately filled. In most cases it would no doubt be safe to do so, but, in the absence of strong reasons to the contrary, I should put a loose dressing of eucalyptus oil into the canals, and a temporary cotton and sandarac stopping into the cavity of the crown, reserving the filling of both roots and cavity till another and generally more convenient day, instructing the patient to take out the temporary stopping if tenderness should occur. On the next occasion if no inflammation is present and the temporary stopping be still *in situ*, fill the roots and finish the tooth. If the patient were obliged to remove the temporary stopping through tenderness occurring, dress antiseptically again and renew the temporary stopping, and so continue until the temporary stopping can be retained without discomfort.

3. *Putrid Roots without Gumboil but with Abscess.*—If an abscess be pointing on the gum, open it with a lancet and so convert the case into one with gumboil (gumboil is to be taken as meaning *Sinus*).

When the abscess cannot be opened externally, treatment is often restricted on the first day with advantage to merely making a drill-hole or opening into the pulp-canal, and so evacuating pus and relieving tension. When the tenderness is not excessive,—open up the canals thoroughly, free them completely from *débris*, disinfect them well, and if pus is freely forming leave them open to drain, instructing the patient to merely place cotton dipped in, say, camphorated spirit, loosely into the cavity during meals, and to take it quite out during the intervals, and to frequently suck the tooth so as to aspirate the pulp-canals. If the pus is not forming freely, absorb it all as far as possible with dry wisps of cotton on bristles, then well pump an antiseptic (as creasote) along the canal, and proceed in the tentative way described above. Do not fill the root till a temporary stopping has been retained tightly in place for preferably as long as a week. Do not use gutta-percha as a temporary stopping where the patient cannot remove it.

4. *Putrid Roots with Gumboil.*—A gumboil being a sinus leading from a putrid pulp-canal provides escape for inflammatory exudation, and therefore would prevent any immediate trouble on immediately filling the root, but, in order to ensure the healing up of any suppurating cavity which may exist in the jaw, it is better to proceed as follows :—

Well open up the pulp chamber, rake out the contents of the canals, insert into each canal a loose wisp of cotton dipped in creasote, or convey creasote into the cavity, if it be in a lower tooth, by means of conveying-forceps. If the blades of the forceps be held together and dipped in fluid they will hold a good quantity of it, like a geometric pen, and will drop it when the blades are allowed to separate. Having filled the canals and pulp cavity with the antiseptic, place a round ball of soft unvulcanized rubber in the cavity ; then squeeze the rubber in, with the largest-ended instrument which can be used, until the creasote forces out the contents of the sinus and finally issues itself freely through the gumboil. Repeat this process at intervals of several days, until the creasote will no longer pass through the gumboil, penetrating it with a probe to break open any superficial healing over. Then permanently fill the roots.

In very long-standing cases where there is a large abscess cavity in the jaw, as proved by probing through the gumboil with a silver probe, the roots may as well be filled immediately. Enlarge the orifice of the gumboil with nitric acid, syringe out the cavity through the hole in the gum with an antiseptic, and put in a drainage tube, either of small flexible rubber tubing or of gutta-percha tissue rolled into the form of a tube. Cut plenty of holes in the sides of the tube. Repeat the syringing at intervals of several days, removing the tube each time and shortening it as the cavity fills up. If it finally refuses to close, and the end or ends of the root or roots remain isolated and bare, amputate them with a screw-cut fissure bur.

While the foregoing remarks will be seen to discourage absolute immediate-root-filling, they will be seen to encourage the adoption of all the care and thoroughness of treatment which has been so strenuously advocated by the advanced immediate-root-fillers, and it behoves one to acknowledge freely that their labours and arguments have been of immense service to dental science, and though not blindly to be followed in the treatment of every individual case, they have been the means of considerably increasing the general success of root-filling and shortening the treatment of dead teeth all round. First and foremost among those to whom we are beholden for introducing this new departure into this country, and urging its claims, is George Cunningham, M.A. He has here scored a conspicuous success, viewing the matter broadly. Before the advent of the immediate-root-fillers, dead teeth were approached more or less with fear and trembling, and their treatment was protracted over many weary and unremunerative visits; the very idea of immediate root-filling being looked upon as an absurdity. Now, dead teeth have lost most of their terrors and treachery, are approached with a confident feeling, and the number of visits devoted to their treatment may generally be reduced to two.

It is now clear that the main things desirable are,—to thoroughly and boldly remove all the putrid material from the root without causing inoculation of the pericementum, to disinfect the canals with some potent antiseptic, and to fill it with something permanent and solid. And I think it can be added that, in the interest of the patient, it is better to wait till the root has had a trial filling before proceeding to the final stage of the operation.

On the motion of Mr. J. F. Colyer, seconded by Mr. Reinhardt, the discussion was adjourned to the April meeting. The proceedings then terminated with the usual votes of thanks.

STUDENTS' SOCIETY, DENTAL HOSPITAL OF LONDON.

THE ORDINARY GENERAL MEETING, held Monday, February 12th, the President, A. E. CLAYTON WOODHOUSE, Esq., in the Chair. The minutes of the previous meeting were read and confirmed. Messrs. S. Colyer, McKay, J. Humphreys, Ludbrook, Bates, Bateman, Jones, signed the obligation book and were admitted members by the President.

Mr. WOODHOUSE then delivered his Inaugural Address. (See page 109.)

On Casual Communications being called for, Mr. AUSTEN read a few notes on the use of "Coryl." He said:—Coryl is the name given to a combination of chloride of ethyl and chloride of methyl, the two drugs being mixed in such proportions as will bring the mean boiling point of the two to 0°C . For employing coryl a special apparatus is required, called the coryliser.

As far as my experience guides me, the best results are to be obtained by attention to the following points:—

(1) The gums should be well dried, and as far as possible all neighbouring regions, such as the cheeks or tongue, protected by napkins or some other suitable means.

(2) The gum should be thoroughly frozen before commencing to operate.

(3) The extraction should be carried out as quickly as is consistent with thoroughness.

(4) If possible, the spray should be continued during the operation.

(5) Too great a jet should not be used.

When all these points were thoroughly carried out, the pain caused by the operation was practically *nil*; but even in those cases where it was found difficult to thoroughly freeze the gum, or carry out the other precautions satisfactorily, a decided lessening of the pain of the operation was brought about in the large majority of cases. Better results were obtained when using the straight nozzle than the curved ones; in these latter a considerable waste occurred owing to the supply holes permitting the passage of far too much material. It was found easier to freeze the gums in the front of the mouth—in fact, in the region of the second and third molars in the lower the difficulty experienced was great, especially on the lingual surface. No ultimate troubles, either local or general, seemed to follow its use, and it lessened the amount of hæmorrhage at the time of the operation. The instrument, and with it the coryl, possesses undoubted objections, some, no doubt, capable of alteration; they may be summarised as follows:—

(1) The necessity of always having to hold the instrument in the dependent position.

(2) The nausea sometimes occasioned by the smell, and especially if some is inadvertently swallowed.

(3) Its use in cases where the pulp is exposed, for unless care is taken to fill the cavity with cotton wool previously to applying the coryl, the pain produced by the freezing may be intense.

(4) In the case of extremely nervous patients or children, the somewhat formidable appearance of the instrument is likely to create fear.

Mr. DAIRS in referring to the use of coryl, said his experience was not at all favourable, the patient very often saying that the pain of its administration was worse than the extraction without it.

Mr. CLARENCE warned members against using it for the purpose of exposing pulps, for which purpose he said his experiments proved it was useless.

Mr. HOLFORD presented a sound upper molar, which he had extracted from a patient, age 32. A year previously it had caused an alveolar abscess, and after rhizodontrophy had been performed, the tooth still remaining very tender, it was removed, and the roots were then seen to be absorbed, and the wisdom tooth in the socket pressing upon it.

The PRESIDENT remarked that the tooth appeared perfectly sound, and that the case was a very interesting one.

Mr. E. F. SMITH showed some good specimens of demination of two temporary, and also two permanent teeth, a double-rooted lower canine, and also one of exostosis.

Mr. D. P. GABELL then moved the alteration in Rule XXIII of "January to May," and also "That the financial year of the Society commence in October."

Mr. T. CLARENCE seconded it.

Mr. D. F. COLYER moved an amendment, "That in the opinion of this meeting it is desirable to leave the existing regulation relating to the Annual Meeting unaltered," which, after discussion, was carried by a majority of 20.

The PRESIDENT then called upon Mr. J. Main Nicol for his paper on "Pain." (See page 97.)

The PRESIDENT thanked Mr. Nicol for his excellent paper which he hoped would bring a good discussion. He advised members to read Hilton's "Rest and Pain," saying that it read more like a novel than anything else.

Mr. DAIRS said he was afraid he did not know very much about Dental Work, but there was one point of Mr. Nicol's which he thought was of very great use. Sympathy with one's patient.

Mr. N. G. BENNETT thanked Mr. Nicol for the very instructive and interesting paper to which they had had the good fortune to listen. Mr. Nicol had truly said that this society was accustomed to hearing good papers, but he thought members would agree that they had rarely listened to one so remarkable for its comprehensiveness and wealth of detail. The reader had referred to the action of a wide-angle lens in dwarfing the proportions of the main object of a picture, but he had certainly succeeded in combining wide range of view with warded emphasis attached to many important points. In connection with the substance of the paper, Mr. Bennett alluded to the point referred to by Mr. Nicol, when he stated that pain was frequently caused or accentuated by pressure on the terminal nerve endings instancing the severe pain experienced in inflammation in a confined space such as tendons and joints. He suggested that the slight spasm of pain sometimes experienced during the filling of a root with gutta-percha might be due to this cause, and not, as was frequently supposed, to the forcing of a small portion of the filling through the apical foramen, and cited an

instance in which he had removed the gutta-percha, and examined it and satisfied himself that none had passed through. The pain would then, perhaps, be caused by the occlusion of a small quantity of air at the end of the root, this air being compressed against the small nerve-endings of the periosteum.

Mr. DODD felt indebted to the reader of the paper, for his valuable and interesting remarks. He would however say two things which, although he candidly believed them both, would make him the most unpopular person present. The first was a criticism of the title of the paper they had just heard. He thought that instead of being headed "Pain," it would have better described itself under such a name as "Some of the Rarer Causes of Pain in Dental Practice." He was one of those who believed that it was well to widen the scope of subjects, read at their Society, to matter which was perhaps a little outside the actual limits of professional work. He drew attention to the redeeming feature of pain. Although nature gave or allowed us to suffer much, yet it must be, and is, limited in amount, and indeed, when a certain pitch of pain had been arrived at, she herself gave the merciful anæsthetic we call unconsciousness. It seemed to him too, that the more pain we had to endure, the better able were we to bear it, the constant shock upon the sensory centres so dulled their keenness of perception that they no longer could announce the stimulus with that clearness that they at first possessed. He instanced this by mentioning the deafening of gunners, from constant sudden auditory shock, and the failing gustatory powers of tea-tasters. He would too mention the beautiful effect of pain on character. They all know that it made men more patient, more considerate for others. Who did not know how much gentler an operator the man was who had had much done in his own mouth? Then too, it made us more sympathetic, and in the dental profession one of the secrets of success, particularly rested in this: he would go so far as to say that those who had never suffered could hardly possess true sympathy for the sufferings of others.

Mr. D. P. GABELL said, he should like Mr. Nicol's opinion as regards some points. They were taught in cases of inflammation when the pain became throbbing it was a sign that pus was present, why was this? Also Mr. Nicol quoted the transference of mastication from the neighbourhood of an exposed nerve, on account of pain, as an example of the beneficial action of pain, but was not the transference of mastication and consequent deposit of tartar liable to do harm. Mr. Nicol said, that pain was the great cause of trismus, traceable to wisdom teeth and not infiltration of the muscle. Mr. Gabell had recently seen a case where the patient received a blow, causing an effusion of blood between the periosteum and the ramus of the lower jaw, the hæmatoma thus formed was so large, and stretched the fibres of the muscle over it to such an extent as to cause trismus quite independent of pain, why might not pus cause the same result. He had had a nerve exposed by having an excavator thrust into it, the effect was practically to stun him for the moment, his sensation could hardly be called painful though it caused him to violently start, due probably to reflex action.

Mr. McKAY said he had suffered from an exposed nerve for some years, but had never the courage to have it treated, until he came

into Mr. Nicol's hands, and he was fully convinced about the benefit to the patient of a little sympathy from the operator.

Mr. A. B. DENSHAM expressed his deep gratitude to Mr. Nicol for his erudite and scientific paper. Commenting upon the method of exposing nerves put forward by Mr. Nicol, he said, this procedure under his hands had commended itself to him and also he thought to most patients, the "scraping" necessary in the ordinary method of exposure being most trying to sensible neurotic patients, he considered the objection—raised by some to this method, on the theory that micro-organisms were carried into the pulps by the rose-head burr—was not a strong one, as the arsenic applied was sufficient to account for large numbers of these bodies. His practice was to introduce a pledget of cotton wool, saturated in chloroform, into the cavity immediately after obtaining the exposure, this relieving the agony almost immediately. With regard to periosteal pain he did not think it was sufficiently considered in gold fillings, support to the teeth whilst malletting by means of the finger or composition, largely relieves this form of pain.

Mr. WHITTINGTON said he had met a case of exostosis that day which he had diagnosed by exclusion of everything else. He would like to ask Mr. Nicol how he explained the pumping action.

Mr. NICOL, in replying, briefly adverted to Mr. Dodd's criticism, and said, that, if his title was not sufficiently inclusive, or there were so many omissions in the paper, these defects he felt had been amply rectified by Mr. Dodd in his remarks. He thought Mr. Gabell guilty of some unfairness in suggesting the identity of two quite dissimilar operations, the unexpected *plunging* of an excavator into the pulp-cavity, and the method of making exposures just described. With regard to his remarks about throbbing pain as diagnostic of pus-formation, he was disinclined to accept it as conclusive, but thought it likely that as tension and mutual pressure were often connected with the death of the leucocytes in suppuration, such tension would naturally be greatest (and hence throbbing pain most marked,) immediately antecedent to the formation of pus. He thanked Mr. Gabell too for his graphic account of mechanically-produced trismus, which he considered of great interest, and acknowledged Mr. Whittington's reply to the question he had asked in his paper. To the last named gentleman he also explained (by diagram,) how the piston action was not necessarily impeded by a certain degree of tortuosity. He regretted that there had not been more discussion, as he had tried for the greatest part, to choose such conditions as were commonly met with and must have interest, and in conclusion desired only to thank those who had spoken, and lest he should be considered guilty of any discourtesy by omitting names, Mr. Dairs, Mr. Densham, Mr. Bennett and Mr. McKay, for their kindly criticisms and interesting remarks.

The PRESIDENT then proposed a vote of thanks to Mr. J. Main Nicol for his paper, and to those gentlemen who had brought forward Casual Communications, and announced that a clinic would be held on Monday, February 26th, and that the next meeting would take place on March 12th, when Mr. Rooke would read a paper on "The Diagnosis and Treatment of a few Exceptional Cases."

The proceedings then terminated.

THE DENTAL RECORD, LONDON: MAR. 1, 1894.

THE NEW DENTAL HOSPITAL.

It was gala day on Saturday, February 24th, to all past, present, and, indeed, future Students of the National Dental Hospital. And, when we say "Students," we mean Students, for they first, and before everything, benefit by the new home, the more complete arrangements, the more healthy surroundings in and amidst which the work of the Hospital will in future be carried on. Present and future join hands in sharing these good things, whilst the past will find in them the fruition of their labours, and a head-quarters of which they will no longer speak with bated breath and half muttered apologies. But the Students are only the first link in the long chain of people, who will benefit therefrom; an innumerable number of patients, a hard-working and able Staff will, it is obvious, gain in almost equal proportion to these. Does the good stop there? We think not. Other schools, cannot but be stirred to healthy action by a rival worthy of their steel, in whom they may find much to copy, whose incentive will prove to them reforms cannot be delayed, whose progressive movements will remind them that there are but two states of existence, the one of progression and the other of retrogression, and between these—nothing! The whole Profession of Dental Surgery will benefit. Mass is but an aggregate of molecules, and atoms make the molecule. Educate each member, imbue him with right and kindly instincts and the whole profession benefits. But over and beyond this we shall profit. Advanced thinkers may perhaps see beyond the dress in Prince and Pauper but a man, but the majority of mankind have no such penetrating vision. With them, to inhabit a noble dwelling is to be an important personage, and we sincerely believe that the public will think better of our cult when they view the handsome hospital in which it has just found a new home.

The history of the building of this Institution is one which opens up a new era in dental life and politics. Since first dentistry cracked its shell and hopped into the world a half-fledged chicken, its movements onwards, its schools, its hospitals for public charity, have all been due to the untiring effort and self-sacrifice of members of its own ranks. Public support it has, of course, in some measure obtained, but in insignificant proportions when compared with that extended by dental men. Now, for the first time, it has gained, and we sincerely think merited, the bountious support of a distinguished member of the nobility—the Dowager Lady Howard de Walden. Unaided, this noble lady has caused the new Hospital to be erected, at a cost of about £10,000, and, not content with this, has provided a site at a merely nominal rental. Surely! hers will be a name revered in dental circles, not only on account of this great generosity, but also because she has been the *first* to take our young profession by the hand and so enable it to carry on its work of charity amongst the poor. Nor must we forget that the future of the Hospital is in a measure attained by the support of a most influential Committee of Management, at the head of which it has for President, His Royal Highness the Duke of York, whose gracious speech, when he performed the opening ceremony, will be received with interest and thankfulness.

News and Notes.

As a result of previous meetings held at 40, Leicester Square, a deputation waited on Sir John and Lady Tames, on February 14th, to present them with an address. Mr. Thomas Arnold Rogers introduced the Chairman of the Committee, Sir Edwin Saunders, who made an interesting speech. "We are here," said he, "in a dual capacity, first, as old friends, who have watched with interest your life pilgrimage, and second, as representing the profession with which you, Sir John, have been so long, so closely and so honourably identified." Finally he called on Mr. Hutchinson, whose work is

largely responsible for the success of the scheme, to read the address, which was illuminated and enclosed in a beautifully bound album :—

“We, who have recorded our names in this book, tender our hearty congratulations to you, Sir John and Lady Tomes, upon the attainment of this, the Fiftieth Anniversary of your Wedding Day. This event, though in some sense a private one, seems to afford an opportunity, which we gladly seize, for expressing in a manner more personal than would be appropriate to any more public occasion, our recognition of your life-work and mutual devotion. The singleness of purpose with which this object (nearest to the hearts of all of us) has been pursued, whether it be the scientific, the social, or the political advancement of our professional interests, has called forth this expression of regard and esteem, which, it has been thought, would take no form more in accord with your well-known feelings, than that of a personal gift to your most devoted helpmate, and the foundation of a scholarship or prize essay, to be awarded triennially to members of our profession, for original work in any direction of scientific inquiry. This it is hoped and believed, will commemorate in rising and future generations, the appreciation by us, your contemporaries, of your life work in the educational reform of your profession, and inspire in them something of the same spirit of high aspiration and self-denial, which has characterized your long and honourable career. We express our earnest hope that you may both be long spared to enjoy your well-earned rest, in the assurance of the warmest good wishes of your many friends.”

Mr. Brunton presented Lady Tomes with a gold inkstand. Sir John Tomes returned thanks on behalf of Lady Tomes and himself. “Had I been consulted,” he said, “in the later stage of your generous actions on our behalf, I could not have devised a more acceptable form of commemoration, for, while the connection of the name with the triennial prize is a great personal distinction, the award of the prize for an original paper of ascertained merit is a direct educational gain to the profession as a whole.” We understand enough money has been collected to provide a triennial scholarship of about twenty-eight pounds in value.

MR. FRANK HAMPTON GOFFE, L.D.S., Eng. and Edin., Honorary Surgeon to the Birmingham Dental Hospital has been appointed Lecturer on Mechanical Dentistry at Mason College, Birmingham.

AT the Second Annual Ordinary Meeting of the Incorporated Edinburgh Dental Hospital and School, held at 5, Lauriston Lane, Mr. W. Bowman Macleod in the chair, the report of the Treasurer showed that special appeals made at the beginning of last year, to enable the Directors to purchase the property in Chambers Street, had resulted in 114 shares being taken in the concern, and in the giving of special contributions. Bailie M'Donald pointed out that the Treasurer would have to receive, in addition to the balance of £611, £1,300 to enable them to fit up the new premises, and said he hoped that by next year the liberality of the public would have enabled them to pay off that sum. The report by the Directors set forth that they had completed the purchase of the property in Chambers Street. The number of students on the practising list was 37, as against 30 in 1892, and the Directors believed there would be a further increase. The large increase in the number of operations and students demanded an increase in the operating staff, and four extra had been appointed, allowing three operators for each day. The special contributions amounted to £891 5s., including £400 by the Lord Provost, Magistrates, and Town Council, from the residue grant, £210 from the Royal College of Surgeons, Edinburgh; £50 from Mr. W. M'Ewan, M.P., and others. The ordinary income was £693 17s., an increase of £176 9s. 3d., and the amount of funds in hand at the close of the year was £611 16s. 9d.

THE Legislature of Quebec has refused to allow the Dental College of the Province of Quebec to grant a doctorate in dentistry. This the college desired to do, join the American National Association of Dental Faculties, and in order to do so, had to make its degrees and arrangements similar.

WE commend, to our readers, the remarks by Mr. Baldwin, opening a discussion on root-filling, at the Odontological Society. We look forward to the conclusion of this discussion at the Society's next meeting. There is, perhaps, no other point on which we hear more dogmatic statements, nor one around which dentals more often indulge in a friendly wrangle. However, these are amusing and very instructive, and from them we gather crumbs of knowledge to help us along with our daily work.

THREE deaths in one month from swallowing artificial dentures quite suggests the fact, that even the more mechanical side of our work is not a matter which should be entrusted to the unskilled and ignorant. We confess we marvel not at these having died but at the accident not being far more frequent than it is. The number of badly made, ill-fitting, worn-out dentures which are being worn must be something enormous. The *first* was the case of Andrew Henderson, who was employed by J. J. & G. Scott, oil merchants, Dobbie's Loan, St. Rollox. Nothing definite is known as to how the incident occurred, but on Monday, January 21st, Dr. Mackeller Dewar, Stirling Road, was called in, and on examination discovered that Henderson had swallowed the upper case of his teeth. He ordered his immediate removal to the Royal Infirmary, where he was taken in an insensible condition. Every remedy was tried, but the man remained insensible and died on the following Saturday. The *second* was reported on January 31st to the Liverpool Coroner. The victim, Healey, aged 60, was a boatswain of a ship now in port; he had been seized with a fit of coughing, during which his false teeth got lodged in his windpipe. He was removed to hospital, where an operation was performed, but the sufferer succumbed. The *third* was a barman, who, some twelve months ago, accidentally swallowed his artificial teeth during a violent fit of coughing. He went to the London Hospital, but was not operated on, as the surgeons when sounding him were unable to find where the teeth had lodged. The patient afterwards returned to work. On 21st of last January he was suddenly seized with illness and died the same day. A *p.-m.* showed that the plate, containing four artificial teeth, had become embedded in the upper part of the stomach on the right side, and around it ulceration had taken place; the immediate cause of death being due to hæmorrhage.

THE *Zahntechnische Reform* states that the elasticity of spoiled rubber bands may be restored by leaving them for half-an-hour in a solution of sal-ammonia, one part; water, two parts.

THE same journal quotes a curious advertisement from the columns of one of the Munich papers:—

“ WHICH DENTIST is willing, with full guarantee of the result, to undertake the thorough cleansing of the denture of a little dog.”

EARLY in this year there passed away from amongst us an old and respected member of our profession, whose long and honourable career well deserves our notice. Mr. John Knox Chisholm, of 15, Duke Street, Edinburgh, died on 3rd of January, at the advanced age of 78. Born in 1816, he was early apprenticed to Mr. Hogue, of Queen Street, Edinburgh, with whom he remained over ten years, acquiring a sound knowledge of his profession and the art of making the mineral teeth with which the name of that gentleman is so deservedly connected. On leaving Mr. Hogue, he began practice in Princes Street, but afterwards came to London, where for twelve months he acted as assistant; returning to Edinburgh, he began the successful practice now carried on by his son, Mr. J. K. Chisholm. In 1861 he removed from Queen Street to Duke Street, where he died. He obtained the Dental Diploma in 1860; was for several years on the staff of the Edinburgh Dental Dispensary (now the Dental Hospital and School). He took an active part in inaugurating the Annual Dinner of the profession, still held in Edinburgh; its object being to commemorate the institution of the Dental Diploma and bring the members of the profession into more friendly relations with each other. The first Dinner was held in 1867. He was also one of the founders of the Odonto-Chirurgical Society, filling the office of President and the other honorary positions in its ranks, and ever took a warm interest in its welfare. About 1874, his eyesight having failed, he was compelled to give up active work, which he felt deeply, but bore with patience. Possessed of a genial and kindly nature, he was ever ready to respond to any advance on the part of members of the profession, which won for him the respect and regard of all. He leaves behind a good name and a pleasant memory, which those who best knew him will ever cherish.

At the City Coroner's Court, Mr. S. F. Langham held an inquest with reference to the death of Frank Lee, aged twenty-five, manager to a colonial merchant, and lately living at Crowhurst Road, Brixton. Henry Creasy, dentist, 88, Newgate Street City, deposed that on Monday the deceased came to consult him with reference to having a tooth extracted with gas. He appeared to be in good health, and was put under gas by Dr. Adams, of Aldersgate street, who had previously examined him. He seemed

to take the gas very well, and witness extracted the tooth. He went on breathing for about a third of a minute, and then the breathing became stertorous. The doctor at once pulled the deceased's tongue forward, and he was afterwards taken out of the chair and artificial respiration was resorted to. Ether was also injected, but, finding that artificial respiration was of no avail, tracheotomy was performed. This also proved unsuccessful, as the throat was full of mucus, which seemed to impede breathing. After half-an-hour's work artificial respiration was given up, the deceased being found to be dead. Witness had carried on business in the City for the last twenty years, and had been in the habit of extracting teeth under gas during the whole of that time. Dr. Adams had always administered the gas, and with successful results. By the Coroner.—The deceased, in witness's opinion, was an exceptionally good patient for gas. Dr. John Adams, 180, Aldersgate street, stated that he had administered gas at Mr. Creasy's establishment during the last twenty years, and had had to deal with about 40,000 cases. Of that number the present case was the first that had proved fatal. He saw nothing about the deceased to attract suspicion that he was not in a fit state to undergo the administration of gas. He seemed exceptionally strong. Dr. Norman Moore, lecturer on medicine at St. Bartholomew's Hospital, who had made the *post-mortem* examination, stated that all the organs were healthy, but he found no air in the lungs and they were engorged with blood. There was also a great deal of thick mucus in the bronchial tubes, and death was caused by asphyxia. In reply to the coroner, Dr. Moore said he believed that everything had been done for the deceased that was possible. The jury returned a verdict of "Accidental suffocation," and added that no blame attached to the dentist or to the doctor. We may perhaps been forgiven for wondering why tracheotomy was not performed, if it was not done, for of this there is no mention in the reports to hand.

THE *Medical Press* records the fact that the Local Government Board for England has decided that it has no power to surcharge the Chichester Guardians with £4 4s. paid by by them for a set of artificial teeth for one of the recipients of out-door relief, and then proceeds to say: "Heretofore the duty of the taxpayer to the

pauper has been considered to be discharged when the pet has been supplied with wholesome food and such luxuries as tobacco and whisky. It seems, however, as if we had come to the times when guardians must follow the dominant craze, and as School Board 'Progressivists' have provided pianofortes and tennis rackets for the children of the omnipotent artisan, guardians must find artificial dentures for the charity pensioner. Let us hope that the authorities will not insult the nobility of the unemployed by offering them cheap vulgar vulcanite, instead of the more proper gold plate!"

THE writer of this has evidently never heard of parish doctors and parish infirmaries. Or, perhaps, he would have preferred the four guineas to have been spent in medical fees and medical mixtures. Or, even more probably, he thought he was writing something smart, and thought no further. What a farce! "Wholesome food," and no teeth to eat it. This gentleman would evidently have been a prominent member in the ranks of those who were aforesaid told "They asked for bread and ye gave them stones."


WE are glad to note that the thoroughly unconstitutional practice, of not having an annual dinner in connection with an English society, is about to be rectified. The President of the Odontological announces his intention of bringing the matter before the Council. We breathe again!

EXCELLENT is his idea, too, of having a reading-room in connection with this Society. At present there is absolutely no reference library available for a dental man. The necessities of his calling preclude his going either to the British Museum or the College of Surgeons, these being open only in the day time. True the Odontological Society's library lacks completeness, but, perhaps, the new librarian may do something towards meeting this. Given such a library, and the museum not quite so invisible an object, the Society will not lack for members, especially if one may also woo "my Lady Nicotine" whilst engaged in looking up odds and ends of interest.

THE Dentists' Register which has just been published, contains 4,795 names. Of these 26.48 per cent. hold a diploma. The universities of Harvard and Michigan contribute 27.

THE Annual General Meeting of the B.D.A. will be held at Newcastle-on-Tyne, on March 29th, 30th, and 31st. The Secretary announces that he expects to make arrangements for Members from London and the South to travel by saloon cars on the G.N.R.—third class fares. The programme of the meeting includes the usual business meetings—excluding Mr. C. S. Tome's Presidential Address, and the Valedictory Address by the retiring President, Mr. Breward Neale — Demonstrations on two mornings, Mr. Mummery's Address to the Microscopical Section, a Discussion on the "Methods of Training Dental Students in Mechanical Dentistry," etc., etc.

THE NEW NATIONAL DENTAL HOSPITAL.

ON Saturday, February 24th, His Royal Highness the Duke of York, K.G., opened the new National Dental Hospital, which has been built in Great Portland Street, at the corner of Devonshire Street, by the Dowager Lady Howard de Walden, at a cost of £10,000. The Hospital is in three stories and built of red glazed bricks, the walls inside being lined with white glazed bricks, thus ensuring ample light and thorough cleanliness. In the *basement* is a fitted lavatory, a students' common-room and residential quarters for the porters and servants. The *ground floor* is occupied by two extracting-rooms, with waiting-rooms attached, a large common waiting-room and a lecture-room, these two are separated by a moveable iron curtain, and when this is raised, form a large L-shaped room, useful for large gatherings, such as that at the Opening Ceremony. On the *first floor* we find a large lavatory with accommodation for forty benches, a small museum and library, the board room and quarters for the House Surgeon, who, we understand, the Board contemplate making a resident official. The *top floor* is occupied by the stopping-room, which is shaped so , with windows chiefly towards the north, but also towards the west and east. Each chair has an electric light hung over it, wires have also been fixed for motors, and water laid on for saliva-ejectors, whilst there are ample arrangements in the way of wash-hand basins, etc. So far, but little has been done as regards internal fittings, though a committee has the matter in hand. We should except electric light fittings, the cost of which we understand, has been wholly borne by her Ladyship. The upper floors are approached by broad handsome staircases, which form

pleasing feature in the building, and afford an ample ventilating shaft to the whole. The main entrance is in Great Portland Street, but there is a separate entrance for patients in Devonshire Street.

THE OPENING CEREMONY.

Great Portland Street was gay with flags and a large crowd of people had collected round the Hospital, many onlookers availing themselves of coignes of vantage on neighbouring houses. A large force of police were on duty, and a guard of honour was furnished by the Honorable Artillery Company, whose band was also in attendance. Punctually at twelve His Royal Highness arrived, being welcomed in the Hall by the Committee of Management, including, among others, His Highness Prince Edward of Saxe-Weimar, the Duke of Fife, the Earl of Strafford, Cavendish Bentinck, Esq., Alban Gibbs, Esq., and the Dowager Lady Howard de Walden. The Duke of York after being shown over the building by the Dean, Mr. Sidney Spokes, arrived in the large reception room, where there was a large gathering. After prayers had been offered by the Bishop of London, the Right Hon. the Earl of Strafford presented an address, in which he thanked His Highness for so graciously honouring them with his presence on that day. He recalled the fact that since the Hospital was founded in 1860, it had been labouring forwards under untoward circumstances in a building unsuited to their requirements and he mentioned the large amount of relief the Hospital had given to the poor. Now they were able to meet in the present handsome building, thanks to the generosity of Lady Howard de Walden, who, he hoped, would, among her many charitable deeds, look back on this with the greatest pleasure.

The DUKE OF YORK rising, said:—Your Royal Highness, my Lords, Ladies and Gentlemen. It gives me much pleasure to attend here to-day, and to assist in the carrying on of such a useful Institution. Of the many hospitals engaged in charitable work for the poorer classes, I feel sure that the National Dental Hospital must afford an amount of relief in the particular kind of cases dealt with here, which some of us are apt to overlook. I am glad to learn from Lord Strafford of the good work done here; and whatever may be the criticism sometimes passed upon the establishment of so-called "special" hospitals, I feel sure that Dental Hospitals cannot be open to objection. One peculiar feature is that the actual treatment of patients is mainly carried out, as a matter of

routine, by students. I am informed that after a special preparatory stage, the student is intrusted with the charge of patients under the supervision of the Surgical Staff. At the close of the curriculum, when the student presents himself at the Royal College of Surgeons, for examination, he has performed all the operations he may expect to meet with during his professional career. Thus the patient and the student render mutual aid to each other, for the former has the advantage of receiving the benefit of skilled treatment. As President of the Hospital, it will give me satisfaction to know that the same good results are continued in the future. I must not omit to refer to the munificent action of the Dowager Lady Howard de Walden. It is due to her generous interest in the beneficial work carried on by this Institution for the last thirty years, that we are able to meet in this handsome building to-day. I have had the opportunity of seeing the excellent arrangements now brought to completion, and I heartily trust that nothing may interfere with the successful attainment of the ends in view, namely, the alleviation of dental troubles amongst the suffering poor, and the education of a race of future dental surgeons who may do honour to the special branch of Surgery to which they will belong. I have now much pleasure in declaring this New Building open for the useful purposes for which it has been erected.

Amidst cheers, the Duke, now taking the Dowager Lady de Walden on his arm, left the room, in the Hall he stopped to unveil two tablets. One refers to the Gift of the Building by the Dowager Lady Howard de Walden, the other to the visit of His Royal Highness.

CLAUSE 3. THE PLYMOUTH CASE.

At the Plymouth Police-court, February 1st, before Mr. W. Law (the Mayor), Mr. J. A. Bellamy, Mr. G. P. Rogers, and Mr. H. J. Howland, Hubert Durham Duff was charged, that not being registered under the Dentists' Act of 1878, and not being a legally qualified medical practitioner, he unlawfully took or used an addition or description, viz., "Dental Surgery," thereby implying that he was registered under the said Act, or that he was specially qualified to practice dentistry. Mr. R. W. Turner appeared to prosecute, and Mr. Percy T. Pearce defended. Mr. Turner said the charge was preferred under Section 3 of the Dentists' Act, 1878, which provided that any person who, not being a legally qualified medical practitioner and not being registered under the Act of 1878, took or used the name, title, addition, or description of dentist (either alone or in

combination with any word or words of the nature of "dental practitioner,") or any name, title, addition, or description implying that he was registered under such Act, or that he was a person specially qualified to practice dentistry, should be liable to a penalty not exceeding £20. The defendant (council said) was seen on the 21st January by Mr. Thomas Smith, a clerk in the employ of the prosecuting solicitors, who then produced to Mr. Duff a card upon which was the name "Hubert Durham Duff," with the words in the left hand corner of it "The Dental Surgery, 195, Union Street." Defendant admitted that it was his card, and Mr. Smith told him that he represented the solicitors to the British Dental Association, who intended to summon him for an infringement of the Act. Defendant said "I have been on the register, and it is not my fault that I am not on now." The card (Mr. Turner submitted) clearly brought defendant under the section he had just quoted. Thomas Smith corroborated. When he visited defendant's place he was shown into a room in which there were dental instruments. He saw on the inner door the words "Co-operative Dental Surgery," and on the outside a lamp bearing the words, "Dental Surgery." There were also swinging signs showing that dentistry was performed within. In cross-examination witness admitted that defendant informed him that he was only an assistant in the employ of Mr. Passmore, of Exeter. Witness further admitted that Mr. Passmore was a duly qualified and registered dental surgeon.

In defence, Mr. Pearce submitted that no case had been made out. The Bench, in the exercise of their discretion, were not entitled to consider as evidence against his client the words that were found exhibited at 195, Union Street. As for those words Mr. Duff could not be held responsible, seeing they were words employed by the person legitimately entitled by law to use them. The charge was that defendant had assumed the words "dental surgery," and that charge could only be based upon the card which had been put in, and to the nature of that card, and the manner in which it was laid out, he would particularly draw the attention of the Bench. Their worships would observe that the words "dental surgery," appeared thereon, not in connection with Mr. Duff's name, but in that portion of the card used for, and in connection with the address which there appeared, and was used merely as a description of the place where his client resided. The left hand corner of a card was always reserved for the address, and did not the words, as appearing there, plainly indicate that "The Dental Surgery, 195, Union Street," was Mr. Duff's residence? Could it be reasonably said that by so placing those words on the card, his client was using a title, implying in the mind of any sensible person that he was registered under the Dentists' Act, or that he was specially qualified to practice Dentistry? To so construe the user would be to say that if lodgings were let at 195, Union Street, and a lodger addressed a letter under the heading "The Dental Surgery," that that lodger would be guilty of an offence within the purview of the section. Such a contention was unreasonable and absurd. The section was a criminal one, and must be construed strictly and not strained. Mr. Duff was an assistant in the employ of a duly registered dental surgeon, who was

entitled to employ him and who was entitled to use all the words that appeared outside 195, Union Street. He (Mr. Pearce) might be asked why the address on the card was an insufficient one? The reason was that 195, Union Street, was occupied by two persons, and the "dental surgery" specifically referred to that portion of the premises wherein Mr. Duff resided. He asked that the case might be dismissed. Mr. Passmore was called, and said that he lived at Esperanza Lodge, Exeter, and was a duly qualified and registered dental surgeon. He had had in Plymouth a dental surgery for upwards of eight years, and visited it regularly two, three, and four times a week as occasion required. The defendant was in his employ, and the premises known as the "dental surgery" were occupied by him. All the words which appeared outside he (witness) was responsible for, as also was he responsible for the work done inside.

By Mr. Turner : Mr. Duff would attend to no cases that came in when he (witness) was not there, and he (witness) was responsible for any treatment the patients received.

The Bench retired, and after a brief deliberation, the Mayor announced that his brother magistrates and himself, without traversing or dealing with the remarks addressed to them by either of the learned advocates, were unanimously of opinion that the section had been contravened. They therefore imposed a fine of £10 and costs, in all £10 11s.

Mr. Pearce asked whether they had based their verdict on the card, as the matter might go farther. It depended upon their answer.

Mr. Wilson, the magistrates' clerk, said the Bench had found the defendant guilty of an offence within the meaning of the section.

Mr. Pearce asked that the card might be impounded.
This was ordered to be done.

The "Daily Chronicle" on Clause 3.—"Clause 3 of the Dentists Act is a most important one, for without it there would be little protection for the public from unqualified practitioners. Upon its construction, in fact, depends the efficiency of the statute as a prohibitory measure. No one but a man holding a medical diploma can practise as a dentist, or describe himself as one, unless registered in accordance with the provisions of the law. Any announcement, in fact, that would lead a patient erroneously to suppose that he is employing a qualified dentist seems to us to be prohibited by the law. The *British Journal of Dental Science*, in its new number, points out that in numerous cases "dental practice is carried on by unregistered persons," who avoid calling themselves dentists, but who call their residences dental surgeries, or otherwise artfully describe the places where business is carried on in such a way as to mislead the public. A case which has recently been decided at Plymouth should encourage the British Dental Association to persevere in trying to put a stop to deceptions which threaten to result in widespread evils, among which may be mentioned the gross injustice involved to all regular practitioners."

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SOME REMARKS ON THE TREATMENT OF INFLAMED PULP.

By FRANK C. PORTER, M.R.C.S., L.R.C.P., L.D.S., D.D.S., ETC.

IN choosing the treatment of inflammation of the pulp as the subject for my remarks to-night, I do so because, personally, it is a subject of great interest to me, and, secondly, because it is one which is daily thrust upon our notice, being in many instances the exciting cause which sends the patient to his dentist.

Before proceeding to discuss the actual subject of my paper, I should like to remind you of the following points connected with the anatomy of the pulp, which have an all-important bearing on the pathology of its inflammation, and consequently on the treatment thereof.

1. There are, so far as is known, no lymphatics in the dental pulp. Obviously, then, should exudation from the vessels occur as the result of inflammation, the means whereby such a state of things would be remedied in other parts of the body is wanting. While on the subject of drainage it may be well to bear in mind the especial difficulty of getting rid of fluid from the pulp chambers of lower teeth on account of gravity tending to keep the fluid in the apical portion of the tooth.

2. The unyielding nature of the walls of the pulp cavity, causing its contents to feel the slightest increase of pressure severely.

3. The inaccessibility of the pulp for the easy and thorough application of sedative dressings to the diseased part. This at first sight may seem contrary to general experience. To clear out the superficial decay from a carious tooth and place a soothing dressing over an exposure, or over the region of the pulp is easy and simple

enough. But the exposure is often minute and, in addition, has emanating from it serum or pus. The injured part of the pulp, on the other hand, is probably of considerable extent and runs far beyond the limit of the surface exposed, extending beneath the dense hard cavity wall. How, then, is the thorough application to be made?

The modes of treatment usually followed is either :—

- I. Employment of means to secure the salvation of the pulp as a living organ.
- II. Destruction of the pulp with the idea of its subsequent removal.

It is not my intention to consider separately the treatment of acute and chronic pulpitis, for clinically the same principles of treatment are applied to both, nor is it my intention to discuss the details of method. I want rather to view the successes and failures of one method as compared with those of the other, and consider circumstances which may contra-indicate the employment of one or other method.

Cases of traumatic exposure, where the operator has by accident drilled into the pulp through hard and healthy dentine, I leave out the question altogether, for the pulp in these cases is not inflamed beyond what ensues from the wound thus given.

For my own part, though I may be mistaken, as my experience is more limited than that of most gentlemen present, I have made up my mind, over and over again, that capping an exposed or inflamed nerve is, except under exceptional circumstances, a proceeding to be avoided if possible. My conviction intensifies as my experience grows.

Having so strongly condemned what, theoretically, is most in accord with modern conservative surgery, I will try to make clear some of my reasons for so doing.

Firstly, I maintain that capping is usually an altogether unsuccessful operation, for the pulp, in the majority of instances, dies sooner or later, in spite of the most careful measures taken to ensure its salvation. To take a common example: A patient comes complaining of toothache. The offending tooth is examined and a cavity found. This is full of remains from several meals in various stages of decomposition acting as strong irritants, at the same time it is a very hot bed of micro-organisms. The cavity is syringed out and the superficial decay removed. A minute exposure is found, or

perhaps the operator, owing to the sensibility of the tooth, refrains from excavating the softened dentine in the neighbourhood of the pulp, leaving the latter, at any rate, unexposed to vision. A sedative dressing is applied and the patient told to come again in two days. Owing to the removal of the irritants and to the absorption of some of the dressing the pain subsides. On the second visit the operator caps the pulp, puts in a filling of low thermal conductivity, or, if he be a bold man, an amalgam or gold over this. The tooth probably remains quiet, but meantime one of two things is happening to the pulp. Either (*a*) resolution of the inflamed part takes place and a scar is formed with, perhaps some so-called secondary dentine; or (*b*) (and this in the great majority of cases) the pulp dies a lingering death, the surroundings tending to favour such a termination in the following manner. Serum, and later pus, continuing to exude have no escape. Lymphatics to carry it away there are none. Artificial drainage has been done away with, for the only outlet has been blocked by a solid plug. Pent up, the serum collects, tending to extend the inflammation by acting as a foreign body and irritant, and secondly tends to strangulation and thrombosis of the vessels by the pressure it exerts on their walls, until finally, as many of us know, the pulp becomes a stinking corpse. The trouble, however, is not over, for one fine day some putrescent matter finds its way through the apical foramen into the pericementum, and then—well! I leave the rest to your imagination, for there are few who have not, at some period of their lives, experienced the agony of an acute alveolar abscess. Truly, the last state of that tooth was worse than the first.

That a tooth with a healthy pulp is in many ways a more durable and serviceable organ than one without a pulp, I grant. It is true in some cases eburnation occurs arresting the progress of further decay. It is true that pulpless teeth are often slightly loose, and are subject to slight attacks of periositis when the general state of the system is run down, and that, as age advances, they are shed before those with healthy pulps. But, of all others, a tooth whose pulp has died, an acute alveolar abscess supervening, is much more subject to the disadvantages above named than one whose pulp has been killed surgically.

Take another very common class of cases. Interstitial cavities with an inflamed and exposed pulp. That the tooth may not feel the inconvenience of sudden thermal changes an osteo has been

inserted. Grant, for sake of argument, the pulp lives. Everythnig is comfortable, and the patient, as patients will, forgets to come and have the tooth examined in a few months time. The osteo at the cervical margin is dissolved away, decay goes on underneath, and the state of the tooth at the end of a year is somewhat worse than it was at the beginning. On the other hand, had the pulp been destroyed, a permanent filling could have been inserted without any difficulty in the beginning. If the insertion of a permanent filling depends on the death of a pulp, I say by all means let the pulp die.

There is, however, a class of cases, akin to that just mentioned, for which I look upon destruction of the pulp as contra-indicated. I allude to those cases where pain has been felt in a tooth when sudden thermal changes have occurred in the mouth, or upon irritants coming in contact with it, but where, upon examination of the cavity, none of the usual signs of an exposure are discovered and when the dentine over the pulp is not very disorganised. In such cases nothing more than mere hyperæmia has occurred in the pulp chamber and the chances are no septic matter has penetrated within its walls. Every facility, therefore, is present for the pulp to return to its normal state, upon means being taken to remove the irritation. It frequently happens that the dentist is often put into a quandary by a patient presenting himself with an exposed and inflamed pulp, stating that it is his intention to start on a holiday the following day. What is to be done? If it can be so arranged that the patient can pay a second visit on the following day, I should unhesitatingly apply an arsenical dressing. The pulp, though probably not sufficiently devitalized to permit of its total extirpation, will have probably become painless enough to permit of partial extraction. An astringent antiseptic dressing can then be applied under a temporary filling. Even should the arsenic have not acted sufficiently to permit any of the pulp being removed, pain is less likely to recur during the weeks following its application, than if it had not been used.

Should however a second visit be impossible, the position and nature of the cavity would, to my mind, be the chief factors in deciding the mode of treatment to follow. If the cavity were such that a filling could be inserted over the dressing, feeling confident that no arsenic would ooze through and get to the gum, I should have no scruples about leaving the dressing in for some weeks, until such time as the operation can be completed. I have known the

wanted small amount of arsenic to be left in teeth for weeks without any untoward result accruing. The amount used must be small and the filling securely inserted.

Certain circumstances render it expedient, however, that we should do all in our power to save the life of a pulp. Chief among these, may be mentioned, children who come under our treatment with an exposed and aching pulp in a tooth, which, though it be erupted, may not have its roots fully formed and calcified. Here, if the life of the pulp can only be prolonged for a few weeks, much progress may be made towards the tooth's complete formation. On the other hand the case requires careful watching, for with enlarged apical foramina, increased facility for septic absorption upon death of the pulp is presented, with a consequent abscess of intensified severity. But, happily, the largeness of this foramen has a compensating advantage:—thrombosis of the supplying artery is less likely to happen, and death of pulp, therefore, less likely to follow.

There is one other point I should like to mention before closing, and that is the apparent inefficiency of arsenic with certain patients. This, I think, is due to the drug not being put into contact with tissue able to absorb it, and one of the following conditions is generally present.

(1) Inflammatory granulation tissue has formed on the exposed surface. This tissue as is well known absorbs drugs very sparingly.

(2) Death of the half of the pulp nearest the crown, the other half being still alive. Frequently I have noticed that when a pulp is in this state, an instrument coming in contact with the dead portion causes pain in the remainder of the organ. Thus it is an easy matter for an operator to be deceived in cases where a good view is not obtainable, and to wrongly imagine he is placing his dressing on living tissue.

If after two applications, it is impossible to get sufficient of the pulp away to warrant the chamber and roots being filled, I generally insert an osteo and wait for two or three months, when there is usually no difficulty in finishing the tooth.

There are, I feel, many things connected with this interesting subject that I have left untouched, and those I have touched upon I feel have been dealt with very superficially and imperfectly. If, however, I have interested you and provided food for discussion, I feel I shall not altogether have written in vain.

EXCEPTIONAL CASES IN PRACTICE—SURGICAL AND MECHANICAL—WITH A FEW SUGGESTIONS.*

By MR. ROOKE.

MR. PRESIDENT AND GENTLEMEN,

I think at the outset in justice to myself, I ought to say that it was entirely due to the pressing and courteous invitation of our worthy secretary, Mr. Gabell, that I ventured to write a paper at all. It seemed an apparently hopeless task, introducing any subject which had not been already threshed out, or importing any novelty for discussion by this Society. Having said so much, I will at once proceed to mention a few cases which have occurred to me, more with a view of obtaining the valuable opinion of the members of this Society present this evening than with an idea of saying anything novel or instructive. I most cordially invite an expression of opinion as to the practicability or impracticability of the ideas of the crown and bridge work cases mentioned, and I shall also be pleased to hear any suggestions in explanation of the surgical cases.

For convenience, I will divide my paper into *surgical* and *mechanical*.

The first case I should like to draw your attention to is that of a young girl, aged nineteen, who was admitted as an in-patient at Middlesex Hospital, with a swelling on her lower jaw on the right side.

On examination, there was a large swelling extending over the right side of the cheek and neck which was very painful, fluctuating distinctly. A good deal of trismus was observable, so much so that it was impossible to thoroughly examine the inside of the mouth. Her temperature registered 103°F. she was placed under an anæsthetic, A.C.E. mixture being given. When under the influence of the anæsthetic her jaws were forcibly opened with an ordinary Mason's mouth gag. Two carious lower molar teeth were discovered on the right side, the gums were greatly inflamed and all the signs of an alveolar abscess present. It was decided to remove both lower molars, these were extracted and followed by a profuse discharge of very offensive pus. The patient was ordered to rinse her mouth frequently with Condy's fluid.

On November 28th, two days afterwards, her temperature was again taken, there being a marked fall, as her chart now registered

* A Paper read before the Students' Society of the Dental Hospital of London.

99°F. The swelling had greatly subsided, though there was still a good deal of redness and tenderness. Hot boracic acid fomentations were ordered by the visiting surgeon, as an opening on the cheek appeared inevitable.

On December 6th, the abscess was distinctly pointing, so it was opened externally letting out a large quantity of pus, a drainage tube was placed in the wound, and hot boracic acid fomentations continued.

On December 8th, the patient felt considerably easier although there was still a little discharge, and on squeezing, a small quantity of pus came from the wound.

On December 12th, suppuration still continued to extend in a forward direction and appeared likely to point again externally just below the body of the lower jaw, mid-way between the angle and the symphysis, the patient felt great tenderness at this spot though the original sinus was progressing favourably.

December 15th, the second spot was subsiding by resolution, there was less pain and tenderness, and the patient felt generally better.

December 18th, while squeezing pus from the original sinus a good sized *melon seed* was squeezed out. The wound was irrigated, c. solution of perchloride of mercury and plugged c. cyanide gauge.

December 20th, the patient was much easier, and great relief had been experienced since the seed was removed; she had no pain and appeared decidedly better.

January 1st, the sinus had quite healed and the patient was discharged.

I have mentioned this case as being of interest, to show the extraordinary and improbable things we come across in surgical cases, and I should like to have the opinion of those present as to the process by which the seed became imbedded in the situation in which we found it.

Enquiry was made as to whether the patient had eaten any melon or similar fruit since the teeth were extracted, and it was ascertained that she had not. The object of course of enquiry was to see if it was possible that the seed had got into the socket of one of the teeth that had been extracted, and as it was not possible to have gained admission in the manner indicated, it becomes a matter of interest to ascertain in what way such an occurrence was brought about.

The opinion of the visiting surgeon was that the seed had been in that position for some months before the patient came to the hospital, but she was unable to give any clear notion as to how it got there.

My own suggestions for the phenomena are, firstly :—

It occurs to me quite likely that at some previous time the patient when eating melons had got a seed impacted between the molars which had gravitated perhaps down the socket of one of the teeth, and the pain and irritation set up may have been attributed to ordinary tooth-ache by the patient, attention to it having been deferred from fear of an extraction.

Another suggestion is, that the second temporary molar may have been extracted early, and that the seed may have made its way down the socket of that tooth and have become embedded in the neighbourhood of the second bicuspid. I am quite aware that it may be considered a stretch of imagination that this seed should have been embedded for such a time, yet seeing how often one hears that such bodies as gun shot remain for a whole life-time without causing trouble, it does not appear to me to be impossible that such a substance as a melon seed should remain impacted in a similar manner as in the above case.

There is another case which I should like to bring before you this evening, and which I consider a very interesting one, showing how tooth trouble may produce secondary mischief in other parts or organs of the body. It is a case which occurred in my father's practice. The patient, a middle aged man, consulted him in order to have his teeth thoroughly examined. He was suffering from a chronic inflammatory condition of the right eye, he had experienced great pain, the eye being very red, absolutely intolerable to light, and there being a profuse flow of tears. He said he had consulted several medical men with reference to his eye, and it seems they could not assign a cause for the condition, or treat him successfully, or even alleviate his pain. At last, one more advanced in minor surgery advised him to have his teeth thoroughly examined, and he consulted my father for that purpose. No evidence of carious teeth or stumps were found, but a good deal of acute periostitis was observable over the roots of the canine and first upper bicuspid on the right side. There appeared to be no cause whatever for this condition, both teeth being apparently quite sound and firm in these attachments. They were first treated by painting the surrounding

gum frequently with equal parts of tinct. iodide and tinct. aconite with little or no benefit, and after some consideration and explaining matters to the patient, it was decided to extract the first bicuspid; the patient had nitrous oxide administered, and on attempting to extract the bicuspid the canine also came away with it, the two teeth being completely exostosed together along the greater part of the lengths of their roots. I regret that I am unable to show you the teeth as they have been mislaid, but I hope to come across them and to present them to the Society at some future date. The patient returned in three days, the pain in the eye having entirely disappeared, and in another week the inflammation had completely subsided.

I think, gentlemen, that the question arises is the first place as to whether these teeth were gemminated together during their development, or whether it was the result of chronic inflammation of the periosteum resulting in the cementing together of the teeth by exostosis.

If it was a case of true gemmination, how did it cause the eye trouble? If, on the other hand, it was a case of exostosis, where did the periostitis come from in the first place?

Whichever of these solutions we accept, the mechanism by which it was brought about was evidently the connection between the superior maxillary division of the fifth nerve and its ophthalmic division.

The next case which I desire to mention occurred in the extracting room of this hospital, and may perhaps be considered rather far fetched. At any rate, I can vouch for the truth of my statements, whether the boy could for his is another matter. Some time ago, a boy came complaining of severe pain in the first upper bicuspid on the right side. He stated that it came on intermittently, and during every attack of pain, he had a sharp shooting pain occurring simultaneously in the front and outer part of the lower third of the right leg. On examination, the tooth was found to be very carious and the nerve exposed. I decided to extract the tooth, which I accordingly removed. I saw the boy the following day, and ascertained that he had had no recurrence of the pain in the leg since the extraction of the tooth. I myself think that in all probability it was nothing more than a strange coincidence. However, I think it is worthy of notice, and perhaps some gentleman here may be able to explain it.

I will now pass on to the portion of my paper having reference to mechanical work, and with your kind indulgence, I will venture to bring to your notice a few suggestions in surmounting difficulties which sometimes occur in making a solid post upon which to build either a gold crown or a porcelain-faced crown, and, although I have only so far been able to apply the practice I suggest to a limited number of cases, I must say the results have been most satisfactory. I know you will all agree with me that the thread which we make with the usual screw tap, used in mechanical dentistry, is so fine, and the bite of the screw so weak when gold is used for this purpose, that we cannot consider a post so inserted in the nerve canal, of sufficient strength to bear the resistance we require. It was in recognising this fact that I commenced to look about for means to overcome the difficulty, and I was induced to try the utility of the screws, which I submit to your notice to-night. I have brought a few with me to distribute among you, in the hope that you will be good enough to try for yourselves the firm and solid post such a screw when properly inserted will make. The screws, you will observe, are made with what are called a wood-screw-worm, and are made of iron, and heavily electro-gilded, so as to prevent any possible oxidation of the metal, and the thread of the worm being so sharp, you can easily understand the facility with which such a screw will cut into the dentine of the tooth. My usual mode of procedure in inserting these screws is to select a drill a size smaller than the screw. I mean by that, suppose for instance, you take the screw you propose using and notice the hole in the screw-plate which exactly fits the screw. You then select your drill to fit the hole next smaller on the screw-plate and, having taken this precaution, you may with safety insert your screw without any risk of splitting the tooth. I am quite sure you will, most of you, be surprised to find what an amount of force it would be necessary to use in screwing these screws into a root of a tooth before the root will split, and it is with a view of testing this for yourselves that I have brought a few with me. I would, however, impress upon you to see that you have the conditions approximate as nearly as possible to the conditions of a tooth in the mouth. I mean by that, that you should try the experiment on a recently extracted tooth or a root which has been previously soaked in water. I do not think you would have a fair test if you were to take a tooth which had been extracted sometime and allowed to become perfectly dry. We might assume in this

latter case that the tooth would be more brittle and the dentine not so soft. I have brought with me to-night a few screw posts inserted into the roots of teeth, and I feel sure you will say we could not wish for anything more solid upon which to build a gold crown or porcelain-faced crown.

If not encroaching too much on the time of the meeting, I would like to elicit the opinion of the students present on a form of removable bridge case that I have been constructing lately. The advantages of bridge work are so many, and its popularity so well established, that I venture to think that if we can get over the difficulty of removal of the bridge, either for a repair or for the treatment of roots lying underneath the bridge, that bridge work will become more generally used than it is at present, and I am strongly of opinion that movable bridge work will, in the next few years, become the highest and most artistic form of mechanical dentistry.

I can assume that every gentleman here is perfectly well informed in the usual methods of making bridge cases, and the only modification I am about to suggest is the insertion of a split pin attached vertically to the bridge at each end, and adjusted in such a manner so as to be inserted into cylindrical tubes fixed to the two gold crowns used as abutments. Perhaps I shall make myself better understood if I proceed to explain by means of a diagram the form of bridge I mean. We take for example a case such as this. Three teeth are to be replaced on the right lower side, that is to say two molars and a bicuspid.

I have made one case identical with the above and it is giving great satisfaction to the patient. Of course I am perfectly well aware that, when the teeth are exceptionally shallow, the tubes would of necessity have to be so short, that it is doubtful whether the split pin would hold the bridge sufficiently firm. But the point I want to bring to your notice, is the more general use which might be made of this mode of attachment for moveable crown and bridge work. I invite gentlemen present to give me their opinion of this mode of attachment, and beg they will be good enough to express freely any objection that may occur to them, as it is only by a free and friendly discussion on difficulties which we meet with, that we may hope to improve the existing methods.

Another modification of bridge work which I propose carrying out on a suitable occasion is what might be called a bridge attached to a gold crown at one end and a clasp with a stop to prevent the

bridge sinking at the other end. This I can better explain by supposing we have a case with three teeth missing and we desire to replace the second bicuspid and first and second molars. The third molar being decayed, I should make a crown for this in the ordinary way, but the first bicuspid being perfectly sound, it seems very rash practice to mutilate such a tooth so as to construct a proper abutment for the other end of the bridge. In such a case I have no hesitation in saying that it would be advisable to clasp such a tooth to prevent motion and also attach a stop or half-crown to prevent the bridge from sinking, rather than the usual method of at once cutting off the crown of the tooth. It occurs to me that a patient may retain such a tooth for many years, and be useful, and that if it did happen, years after, to decay, the ordinary practice now in vogue might be then carried out. I am quite sure that gentlemen who have noticed the great objection which patients have to bridge work, mainly on account of the necessary mutilation of sound teeth, will appreciate the advantage of any method by which this may be avoided. I trust you will not consider it presumptuous on my part in suggesting the views I have mentioned in this paper, many of which I know may be considered unorthodox, but I trust that you will agree with me that it is only by now and then experimenting with the different ideas that every now and then occur to us that we can hope to make any advance or improvement in modern dentistry.

REPORTS OF SOCIETIES.

THE ODONTOLOGICAL SOCIETY OF GREAT BRITAIN.

THE ORDINARY MONTHLY MEETING was held on the 5th ult., Mr. F. CANTON, the PRESIDENT, occupying the Chair.

The minutes of the previous meeting were read and confirmed.

Messrs. Rhys Price (Clapham, S.W.), J. D. Whittles (Birmingham), W. R. Wood (Brighton), and W. Ambrey Farebrother (Salisbury), were nominated for membership.

The following gentlemen were ballotted for, and duly elected members of the Society :—

Leslie G. Austen, L.D.S.Eng.; Leonard Brown, L.D.S.Eng.; John Robert Freeman, L.D.S.Eng.; Edward Caleb Joseph Hall, L.D.S. Eng.; John Trevor Hankey, L.D.S.Eng.; Philip Harrison, L.D.S.Eng.; Albert William Henley, L.D.S.Eng.; Walter John

May, L.D.S.Eng.; William Francis Mellersh, L.D.S.Eng.; Frank Morley, L.D.S.Eng.; Harry Linsell Pillin, L.D.S. Eng.; William Bertram Sansom, L.D.S.Eng., D.M.D.Harv.; Joseph Sefton Sewill, L.R.C.P. Lond. M.R.C.S.Eng.; Scanes Spicer, M.D.Lond., B.Sc.; Harold E. Bullen, L.D.S.Glas.; Ernest V. Coles, L.D.S.Eng.; Arthur Curle, L.D.S.Eng.; Albert John Gear Evans, L.D.S.Eng.; Hedley H. Ham, L.D.S.Eng.; Frederick Haynes, L.D.S.Eng.; Vacey Limington Hope, L.D.S.Eng.; Charles Septimus Hull, L.D.S.Glas.; Percival T. Leigh, L.D.S.Eng. and Glas.; Edward A. Manton, L.D.S.Eng.; Charles Henry Oram, L.D.S.Eng.; William Armston Vice, M.B., C.M.Aber., L.D.S.Edin., D.D.S.Phil.; Richard Ernest Woodcock, L.D.S.Eng.

Mr. W. R. HUMBY read a casual communication on Sullivan's Cement. He said that in selecting it as a subject for the consideration of the Society, there was some risk of wounding the susceptibilities of those who still employ it as a filling. But the selection of filling materials was a matter of such extreme importance in securing sound enduring stoppings, that the risk must be taken. If a tooth be fixed in a vice, and a cavity prepared and filled in the most careful manner under the most favourable circumstances, and be after examined critically with a strong lens, faults, though not serious ones, would be seen. These minute faults might be present and yet not endanger the safety of a plug under ordinary conditions of the mouth. In support of this assertion he would say that most fillings, which were doing good service, and would probably go on doing so, abounded in defects which did not need any lens to demonstrate them. Sullivan's Cement, as they would be aware, was a Copper Amalgam, and its chief faults were:—first, that its rate of attrition was greater than the tooth substance; secondly, it had a tendency to break up and disappear at cervical margins even quicker than by the wear of eating; further, it stained the tooth tissues a very objectionable colour. The reputation enjoyed by the cement was based on the fact that it does not expand or contract, and an erroneous belief that the salts of copper soaking into the tooth prevents any further decay. Its colour being black it resembled several other filling materials which did preserve the teeth. Coin silver amalgam was in outward appearance very similar to Sullivan's. Palladium amalgam was also black on the surface, but might be distinguished from copper amalgam by being non-lustrous if scraped or filed. Jamieson's Eclipse if unwashed becomes a jet black in

some months. Submarine alloy was also black. On the good work done by other materials, the repute has been falsely obtained, Though it would be wrong to say that Sullivan's Cement was in every case bound to fail, Mr. Humby could affirm that during a practice extending over many years, in no single case were symptoms of failure absent in fillings which came under notice the third year after insertion. Many failures were discovered in time to do something still, and the teeth saved after much trouble. Others unfortunately, by their failure, had tired out the patient, who, rather than submit to further trouble, preferred extraction. In one striking case, two out of four front teeth filled three days previously on their lingual surfaces with copper amalgam, became changed in colour to a pale green, the patient being a young lady. The fillings were drilled out at once and gold inserted, but the colour deepened until it was so very objectionable that the crown of the left central had to be replaced by a Logan, the lateral it was contemplated to crown in a like manner. It was not necessary that any comment be made on the alterations in bulk, as the teeth shown would speak for themselves. There was a useful purpose to which the cement might be put, *viz.*, to face the models taken for use in the construction of dentures and crowns to prevent wear during manipulation in the workroom. It might be easily and rapidly made and the models might be softened and used again and again. Mr. Humby showed a large number of teeth filled with the cement in question, which he had been unfortunately compelled to extract, and which illustrated the objections of which he had spoken.

Mr. E. W. ROUGHTON narrated the particulars of a case of dentigerous cyst in the lower jaw. The patient a lad aged ten years, was admitted to the Royal Free Hospital under his care in December 22nd of last year. Nine months previously the patient noticed slight soreness of the lower jaw, followed soon afterwards by the slow development of a swelling in the region of the angle of the jaw. When admitted there was a hard non-elastic swelling the size of half a walnut situated at the left angle of the lower jaw. From digital examination the tumour seemed to grow from the interior of the jaw expanding the outer plate considerably, and the inner plate to a much smaller extent. Diagnosing the tumour as a myeloid sarcoma, Mr. Roughton decided to operate from the outside. The patient having been put under chloroform, an incision one and a half inch long was made over the tumour, dividing the facial artery

between two ligatures. When the tumour was exposed it was seen that the bony walls were very thin indeed, and that the tumour was cystic. On freely opening the cavity, some thin reddish fluid escaped, and the crown of a molar tooth was seen snugly reposing within. The tooth and the lining membrane were removed together, a good sized piece of the cyst wall was then cut away with bone forceps, and an attempt was made to diminish the size of the cavity by breaking in the walls of the cyst, but in doing this the jaw broke across at the angle. The cavity was then stuffed with gauze. Healing took place quickly and the jaw united well, the patient being sent home about three weeks later.

Mr. BLAND SUTTON said that the interesting case to which they had just listened illustrated some of the very great difficulties in diagnosing between sarcoma and dentigerous cysts, but the object of his interposition was to point out the unsuitability on the ground of indefiniteness of the term "Dentigerous Cyst." The term was employed to indicate ovarian tumours, rectal tumours, tumours in the skull, and tumours in the neck. He ventured to suggest that in a society like the Odontological Society, so loose an appellation should be abandoned for one more precisely indicating tumours of the jaw.

Mr. STORER BENNETT desired to bring to the notice of the Society a case which, notwithstanding Mr. Bland Sutton's protest, he would still designate as one of dentigerous cyst, because the term had become classical among them from long use, and for their purpose it sufficiently defined what they understood as a cyst developed in the jaw. The case which he would be glad if the members present would examine (the patient being in attendance in another room), was that of a man aged from 25 to 27, who came to the hospital about three weeks previously with a swelling over the right upper incisor. The cyst was opened and contained an unerupted tooth. Pus was evacuated when the cyst was opened. The patient had no lateral in the alveolar arch, and a smallish gap existed between the central and canine. He stated that he had a small tooth with a short root extracted from this space with the object of obtaining relief from the pain. The tooth in the cyst Mr. Bennett took to be the missing lateral; it was inverted and pointing upwards towards the nose in the direction of the left side. It seemed loose, not very firmly attached to the bone, and with the root only very slightly developed.

Mr. T. E. CONSTANT (Scarborough), then read a paper on "Pental." A preparation resembling pental, known as amylene, was extensively used in 1856-57, but, two or three deaths having resulted from its use, it was abandoned until recently, when it reappeared under its present name. It is claimed that by its present process of manufacture it is freed from the impurities supposed to be responsible for the deaths caused by amylene. Pental is a colourless liquid of low specific gravity, obtained from amylene hydrate by heating with acids; it is insoluble in water, but mixes with chloroform, ether, and alcohol. It is extremely volatile and inflammable, and has a peculiar and somewhat disagreeable odour, but is so little irritating that the pure vapour can be inhaled without the slightest discomfort. Mr. Constant in his early experiments adopted the open method of administration, but subsequently he came to the conclusion that it should never be employed; first, because it is very wasteful, both of the drug and the administrator's time; secondly, because there is usually considerable excitement before anæsthesia supervenes; and thirdly, because individual susceptibility to the drug varies so much that (in the absence of the usual indications of anæsthesia) it is almost impossible to know when the patient is sufficiently "under" to render an operation painless. If the pental were pushed until the conjunctival reflex were abolished and muscular relaxation established, the last objection would be overcome, but to do this would, in some cases, necessitate the use of more than an ounce of the drug, while the patient would be subjected to unnecessary risk. The first case in which he employed it was for a girl aged about eighteen. The apparatus used was one of the old-fashioned cone-shaped gas face-pieces with inspiratory valve at the summit of the cone, and expiratory valve about half way between its base and apex. He removed both valves and fixed a spiral wire upon which lint was stretched inside the face-piece, so that by dropping pental through the opening left by the expiratory valve it would fall upon the lint. After the first two or three inspirations the pulse became rather accelerated, but its force was not diminished. The face became flushed and just before the termination of the administration the pupils became slightly dilated, the eyes fixed and staring, the lids being widely open. Respiration was unaltered. In three minutes from the commencement of administration the conjunctival reflex was lost, four and a half drachms of pental having been used. He then operated, although

there was no muscular relaxation, extracting three roots of a left upper first molar, a second bicuspid, and two roots of a right lower molar. The patient remained unconscious for about a minute after the teeth were extracted, coming to with a start and a vacant gaze around the room. There were no after effects and, when the girl was seen a few days later, she expressed herself quite willing to "take it again" if necessary. The case was fairly typical of all (about thirty in number) in which this form of apparatus was used, excepting that in the majority he operated before loss of the conjunctival reflex became manifest. The form of inhaler he ultimately adopted was simple in construction, and one he had previously used for giving a whiff of ether with the gas. It had an oval chamber into which through a bent funnel the pental was poured. A central tube ran through the chamber, and the face-piece was attached to one end, and the bag to the other. Half way along it was a half diaphragm, on either side of which were key-hole slots forming the means of communication with the chamber, and the inside of the tube. Inside the central tube, just mentioned, was another tube fitting it closely, which by turning a handle might be made to revolve. Turning the handle in one direction enabled the patient to breath into and from the bag, no air passing into the chamber; turning it in the opposite direction permitted the expired air from the patient to pass through the chamber into the bag, the inspired air retracing the same course. In intermediate positions of the handle, proportional quantities of air passed through the chamber, the rest passing direct through the central tube into the bag. He used this apparatus in about 180 cases. The method was as follows:—About two drachms of pental were poured into the inhaler, the bag being detached and the handle turned to O. It was then applied to the face, and the patient directed to breath deeply, the bag being popped on at the end of an inspiration, and the handle turned to a quarter on, and from ten to fifteen seconds later turned fully on for one or two inspirations, and then turned again to O, the patient being allowed to expire into and respire from the bag until nearly forty seconds from the commencement of inhalation, when, as a rule, the operation might be proceeded with, the usual duration of administration being from thirty to forty seconds. The amount of pental used was from a half to nearly one drachm. Almost immediately the pental was inhaled, there was, in the majority of cases, slight flushing of the face and quickening of the pulse, but no diminution of its force. Respiration, if quiet at

the commencement of the inhalation, became deep and rapid when the handle was turned to full, but quieter when it was turned off. The eyes, if closed, opened as the patient became anæsthetised, and had a fixed and staring look. The conjunctival reflex was rarely lost, although in some cases Mr. Constant noticed its absence, after four or five inspirations, particularly if they were deep. In a few instances there was profuse perspiration after about thirty seconds inhalation. The duration of the anæsthesia varied from one to three minutes. There was no muscular relaxation, and no after effects when the pental was administered exactly in the way described. By a variation of the method he had in some few cases induced anæsthesia and successfully performed operations free from pain *without* producing unconsciousness.

As an illustration, a lady aged about forty, required the extraction of a left lower molar. He assured her that if she would do exactly as she was told, the tooth should be extracted painlessly, but at the same time she should be sufficiently conscious to follow his instructions. He used the apparatus already described, containing rather more than two drachms of pental, but turned the handle on to full at the very commencement of the inhalation. After the patient had taken four deep inspirations, he laid aside the apparatus—the patient following his movements with her eyes—told her sharply to open her mouth widely, it was not previously propped, and extracted the tooth without any movement or expression of pain on the part of the patient, though it was a difficult one to remove. A few seconds later, the patient, on being directed to rinse her mouth, seemed a little dazed, and had no recollection of the operation, though she remembered being told to open her mouth. He had had three or four similar cases, except that in those the patients remembered the extraction of the teeth, although there was no recollection of pain, and in no instance was there any struggling or noise. In a similar way he had extracted nerves from the front teeth, but in every case in which this was done, the patient either felt pain or was completely unconscious. In only one case had dangerous symptoms manifested themselves, but this was interesting as indicating the great power of the drug. The patient, a lady, who, it was afterwards elicited, was just convalescing from a severe attack of bronchitis, required an upper tooth extracted, and about $\frac{3}{4}$ drachm pental was administered, the handle of the inhaler being turned on full, and remaining so throughout the administration to ensure

anæsthesia. The breathing was very deep, and after a few inspirations Mr. Constant became aware that the whole of the pental had evaporated. Complete anæsthesia supervened, in less than thirty seconds the face-piece was removed, and the tooth extracted. The patient's respiration immediately became markedly slower, ceasing altogether about a minute after the removal of the face-piece. At the same time the radial pulse became almost imperceptible. The inversion of the patient restored the pulse, but not the respiration, and cyanosis was then observed. The patient was thereupon placed upon the floor and artificial respiration was commenced, but in spite of it the cyanosis deepened. After persisting in it for seven minutes, the patient herself initiated respiration, and then the recovery was very rapid.

Mr. Constant's deductions from his experiences were, first, that pental would never come into general use for major operations, because of the difficulty of maintaining profound anæsthesia by the open method, and the danger that would result from prolonged administration with an apparatus such as he had described. Further, he believed that if pental were pushed to the extent of causing complete muscular relaxation, it would prove a more dangerous anæsthetic than any in general use. While it had not the advantage of the perfect safety of nitrous oxide, he nevertheless believed it to be safer than, and superior to, chloroform for tooth extraction. Contrasted with nitrous oxide, pental had the following advantages:—The apparatus required for its administration was lighter, more portable, and less alarming in appearance; it produced longer anæsthesia, and there was an absence of stertor, jactitation, cyanosis, and, indeed, all symptoms calculated to alarm a spectator.

Dr. PRINCE STALLARD (Manchester), said, that until last September he knew little or nothing of the drug, but about that time at the solicitation of their house surgeon he administered it, and, not knowing in what way to try it, like Mr. Constant, he first used the open method, but he could not recommend it. He had tried pental on fifty females between the ages of thirteen and forty-five. The first case was that of a girl aged twenty-two, he administered the drug on a napkin in a similar manner to that employed when giving chloroform. He used one-and-a-quarter ounces and anæsthesia was produced in three minutes, the patient remaining "under" one-and-a-half minutes. There was marked dilatation of the pupils, the breathing was normal, and the muscles perfectly flacid, there was no

after trouble, and the patient made a good recovery. After trying the open method in six cases he determined to abandon it. Having in some instances used a mouth prop, he had come to the conclusion that opening the mouth with a Mason's gag was far superior. He now gave penthal with an ordinary Clover's inhaler, turning the indicator first on to one and seldom having to go to three, the anæsthesia produced was very marked, and very nice in every way. Two cases caused him an immense amount of anxiety, in one the drug was administered with a Clover inhaler, and a gag in the mouth to a girl aged seventeen. The true anæsthetic period took fifty seconds and there was much stiffening of the muscles. After extraction, while still "under," the respiration suddenly ceased—he had not time to feel the pulse, but noticed that she had become extremely pale. He did not invert her, but only used artificial respiration for a period of two minutes, when the long wished for sighing commenced, and she made a good recovery. In the second case the patient was also a young girl, a servant, aged twenty-two. A Clover's face-piece was used without a prop. True anæsthesia lasted thirty-nine seconds. The girl was most remarkably anæmic—six stumps were removed with absolutely no bleeding, the respiration stopped after she had been seventy-two seconds under. Artificial respiration was carried on for five minutes, and Dr. Stallard really thought he should lose his patient, but during this time it was noticed that her corset was extremely tight and he directed the house surgeon to rip it up with a knife, a satisfactory recovery was ultimately made. Dr. Stallard thought that one should be extremely careful about giving penthal to anæmic patients. He had often noticed in giving gas that after the removal of the face-piece the anæsthesia becomes deeper, and he observed the same thing with penthal. Patients make no complaints as to after sensations except of headache, he had one case attended with vomiting, but enquiry elicited the fact that the patient had had a heavy meal. He thought that all those who had administered the drug must admit that it was very useful in the extraction of several teeth. It was a great gain to have a drug which is not so dangerous as chloroform yet giving nearly double the duration of anæsthesia produced by nitrous oxide. With regard to rigidity, he found by the closed method that he got little or none at all. In conclusion, he thought that Mr. Constant had rendered a great service to the profession in so boldly trying an untried anæsthetic in private practise.

Mr. C. CARTER BRAINE said, that he had had no actual experience in pental, but in listening to the paper one or two things struck him, in the first place, there seemed to be great difficulty in telling when the patient was "under," and there were very few signs to go by, this he thought constituted the drug a dangerous one. Then, again, the odour of pental was very unpleasant. He was also surprised to hear that the closed method was the best.

Mr. CONSTANT in reply said, that he should like in the first place to express his regret at the absence of Dr. Dudley Buxton, the more so as his inability to contribute to the discussion was due to illness. With regard to the unpleasant odour referred to, he had never had a patient complain at all, many to whom gas had been previously administered said with regard to the unpleasantness there was little to choose. As to the safety of pental, contrasted with nitrous oxide, he should call it unsafe, but in the country, chloroform was so frequently used, even for the extraction of a single tooth, that in pental he thought they had an agent which would very satisfactorily replace chloroform. He had endeavoured to keep his paper free from bias and he hoped members would be able to draw their own conclusions.

The usual votes of thanks having been passed, the PRESIDENT announced that the next meeting would be held on April 2nd, and would be devoted entirely to a discussion of "Root Filling," opened by Mr. Baldwin at the February meeting.

The proceedings then terminated.

STUDENTS' SOCIETY, DENTAL HOSPITAL OF LONDON.

THE ORDINARY GENERAL MEETING, held Monday, March 12th, the President, A. E. CLAYTON WOODHOUSE, Esq., in the Chair. The minutes of the previous meeting were read and confirmed. Mr. W. H. Baker signed the obligation book, and was admitted a member by the President.

The PRESIDENT then announced that it was his intention to give a Prize for the best Casual Communication, the conditions for the Competition being :—

1. That the award should rest with the President.
2. That notice of communications be given to the Secretary three clear days before any meeting.

3. That the communications be in writing, and be read by the members making them.

4. That the time occupied in reading each communication do not exceed five minutes.

5. That the communications be limited to cases met with in the experience of, or personally observed by, the members reading them.

6. That the members be in their first or second hospital year.

The announcement was received with acclamation.

On Casual Communications being called for,

Mr. DAY showed some specimens of german-silver wire which were used by him for pivots in place of the usual dental alloy. The advantages claimed by him being that of cheapness and strength.

The PRESIDENT said that his experience was that german-silver, when used for experimental plates, was very nasty stuff to work with.

Mr. NICOL said, as far as he could see, the only advantage claimed for german-silver was that of cheapness. He found that the position where a pivot pin broke was generally at its point of union with the crown, so that it did not make much difference what the material used for the pin was, as long as it was strongly soldered on.

Mr. MOSELEY said that he found, when using gold solder in connection with german-silver, it seemed to rot it so that the pin very often broke off. He should also like to know whether or no german-silver discoloured the teeth.

Mr. DAY, in answering, said that it was his opinion that one universal pin should not be used in every case. He claimed that german-silver was stronger than gold or platinum, and equally strong as dental alloy. As regards the rotting mentioned by Mr. Mosley, it should not be plunged into cold water immediately after soldering. The discolouration of a root was unimportant.

Mr. NICOL made a communication relating to a cyst, accidentally developing in connection with the treatment of a pulpless upper lateral; it was mistaken for an abscess, was clearly of inflammatory origin, and, although every effort was made to establish a communication between it and the root canal, none appeared to be present. After suggesting a lymphangitis of saprophytic origin, and not of sufficient acuteness to produce suppuration, with localized collection of the effused serum in the lower connective tissue, so as to dilate it into a distinct cavity, as a reasonable explanation of the phenomenon, and apologising for its scientific rather than clinical

interest, Mr. Nicol mentioned that the treatment adopted was free incision followed by scraping and packing for twenty-four hours, and that healing was complete at the end of ten days.

Mr. MAY said he had met with a case in private somewhat similar, in which the root had been filled with iodoform and carbolic, and a swelling was found which caused the bone to bulge, and crackling could be obtained in the palate. On removal of the filling a discharge, of what appeared to be yellow serum, took place.

The PRESIDENT remarked that both cases were very interesting, but were very different in character.

Mr. SMITH presented a conical supernumerary incisor which, he said, figured in Messrs. Smale & Colyer's book ; also a lower second molar with the anterior root bifurcated and the posterior enlarged very much.

The PRESIDENT then called upon Mr. Rooke for his paper (see page 150).

The PRESIDENT said that the account of the melon-seed was most extraordinary. Knowing how a needle travels about in the tissues, he supposed it might have been bitten into the cheek. He should like to know the age of the patient in the exostosis case. The screws shown seemed to him to be very useful, and might be used with advantage in many cases. His only objection as regards bridge-work was the mutilation of sound teeth, and the idea of the writer was excellent ; the only point which seemed weak, to his mind, was the cup into which the pins fitted.

Mr. MAY remarked that the screws should prove exceedingly useful for holding in amalgams in fragile teeth, provided that they were made of a metal to which the amalgam would adhere. The parallelism of the tubes seemed to be the only objection he could see to the bridge-work.

Mr. MELLERSH remarked that for most purposes he had found an ordinary D.A. pin, roughened and fixed with osteo into the root of a tooth, sufficient to retain fillings in place. As regards bridges he considered Mr. Storer Bennett's modification of the Gartrell was much better than Mr. Rooke's. He then briefly illustrated the method of making the same.

Mr. MOSELEY said that the Gartrell bridges were, in his opinion, the best ones that could be used. Certainly the removable ones were the most useful. The bridge referred to by Mr. Nicol was the Curtis, and was supposed to be an improvement on the Gartrell.

He thought the distinction of Mr. Storer Bennett's, *i.e.*, calling the junction of two normal teeth "gemination," and the junction of a supernumerary with a normal tooth "gemmation," an excellent one. There was a case of pain in the leg arising from dental trouble, mentioned by Mr. Salter in his book on "Dental Surgery," which somewhat resembled Mr. Rooke's case.

Mr. W. P. GABELL said the remarkable feature in the first case of Mr. Rooke's was the rise in temperature, which was very unusual in dental cases.

Mr. NICOL, after saying with what interest he had listened to Mr. Rooke's paper, briefly commented on the melon-seed incident, and suggested that the absorbent nature of the foreign body prevented its encystment, and quoted a case mentioned by Mr. Treves of a wheat-seed giving rise to a similar disturbance in the eye. He also stated that some cases of ophthalmia, occurring in connection with exostosis of teeth, were not a consequence of the latter but a concomitant, both being produced by some stimuli descending the trophic fibres of the fifth cranial, and thought it not unlikely that cementosis once established might further react and augment the unfavourable ocular symptoms. With regard to the author's description of a removable bridge, a recent account of a somewhat similar contrivance, but rather stronger, and certainly more difficult of construction, in the current number of the *Dental Cosmos*, would interest all the members of the Society. His experience of this class of work was too limited to be of great value, but removable bridges commended themselves by the trifling mutilation of natural teeth which they involved, by their more ready adaptability for cleansing, their great similarity to the natural organs in the possession of slight movement, their ready repair when injured, and, when required as a matter of utility rather than for purely æsthetic reasons, by their throwing part of the force of mastication through a wide base on to the underlying gum, so that the supporting teeth or roots were much less strained.

Mr. NORMAN said he saw no advantage in removable bridges over fixed ones with the teeth ground to a knife-edge.

Mr. MELLERSH said that, when broken, a removable bridge could easily be repaired, whereas a fixed one gave the operator a great amount of trouble to remove.

The PRESIDENT said his objection to bridges was that they allowed no movement in the teeth used for support, so that very often

you got very unpleasant periostitis in such cases. As the Gartrell bridge allowed of movement in the teeth, it commended itself to him on that account,

Mr. SCHELLING said that he had lately met with a case in which a bridge had been fixed in the mouth, with a spur round a bicuspid for support, the consequence being that the latter had decayed badly and was in such a condition to prevent stopping.

Mr. ROOKE having briefly replied, a vote of thanks was accorded to him and to those gentlemen who had brought forward Casual Communications. The President then announced that the next meeting would be held on Monday, May 14th, when Mr. H. Norman will read a paper on "Dental Education."

OXYPHOSPHATE AS AN ADHESIVE MEDIUM.

By J. C. ST. JUST, D.D.S.

To secure adhesion between the walls of a cavity and any metal, we must use a cement; understanding the most desirable qualities for that to possess, we mix some one of the good oxyphosphate cements, which is always at hand. The amount of cement to be left in the cavity is usually small; so that it is seldom necessary to carry but a small amount to the most accessible wall of the cavity, where it is scraped off of the instrument at the margin of the cavity. No particular attempt is at this time made to spread it over the walls of the cavity as it will not always be an easy thing to do and much valuable time will be lost. Enough amalgam to make a thin layer all over the walls of the cavity, and of the right consistency to permit its being readily and perfectly adapted to the same is then placed in the cement and quickly carried, forcing the cement and air ahead of it, all over the walls of the cavity until they are completely covered. Press home with as much force as the case will admit of.

To insure a perfect metal contact of the filling at all margins, no matter how remote they may be, it is simply necessary to carry a properly shaped excavator around these margins, and remove both the metal and cement at the enamel edge of the cavity.

This layer of amalgam so adapted will remain where first placed, and the remainder of the filling may be built up after any method which is indicated.—*Dental Review*.

THE DENTAL RECORD, LONDON: APR. 2, 1894.

"PREVENTION IS BETTER THAN CURE."

IN the course of an interesting paper on a successful case of Œsophagotomy and Gastrotomy, for the removal of a denture, published in the *Lancet*, Mr. David Wallace says:—"It would be interesting to know the percentage of persons, above twenty-five years of age, who possess false teeth. It is certain that amongst domestic servants and shop girls, in whom it is almost the rule to find decayed teeth, very many have artificial substitutes. These substitutes are frequently badly fitting, and, after a time, become insecurely fixed. More particularly is this the case when the plate carries only one or two teeth, and is small in size." Is not this paragraph very suggestive? It certainly would be interesting to know this percentage, but, we fancy, it would vary very considerably in different classes of the community, with the patients of different practitioners, and in different parts of the country. Those, who can afford to avail themselves of dental aid from childhood's days, should certainly be able to retain their own teeth much longer than those, who cannot do so, still, *per contra*, wealth often brings with it conditions of life, which we cannot regard as most fit for the development of durable teeth. Whether or no malformations and deteriorations, the result of disease, are hereditary, certainly the child must thank its parents for the kind of teeth, good or bad, which it possesses. Given a healthy mother, living a rational life, and having fit and proper food, one might almost look upon it as a certainty that the child of such would have sound tooth structures, provided, of course, the child did not itself contract disease. It is an everyday experience that the country labourer has infinitely better teeth than the working-man in a town. It is not wholly a question of food, for the town-bred man has probably more abundant and better nourishment than the farm servant; it is the whole condition of existence; the one

natural and healthy, the other artificial and unhealthy. Wealth, *per se*, can be no bar to health, but if it brings with it conditions dissimilar, when viewed casually, but essentially similar to the artificial existence of a town labourer, the mother will be unfit to rear her child, and it will be sickly. Of all the tissues of the body, the teeth are, perhaps, the greatest tell-tales of poor nourishment in utero, and of a sickly childhood. Once formed they are not altered, and the early date of their development exposes them to damage during the earliest days of our existence. The bearing of these considerations is apparent. Children of healthy parents, and reared in a proper manner, provided with good dental aid, will retain their own teeth long after twenty-five years of age, and need no artificial plates to add yet another risk to the lottery of life. We are convinced that any table giving the percentage of persons wearing false teeth, and, therefore, having badly formed teeth, would but confirm our remarks. That accidents will happen to the most scientifically constructed denture, is simply another fact, if another be needed, urging on the mother a condition of existence favourable to the development of her child, and on all responsible for the rearing of children, whether parents or the guardians of schools for the poor, early and proper attention and advice for the teeth, for every dentist knows, that, if the dental tissues are properly calcified, malformations, such as pits between cusps, crowding of teeth, etc., can readily be treated before the mischief goes further, with good hope of placing the teeth in such a state as to resist disease for many years. Thus at no time is a dental surgeon of such use to a patient, as during the years of growth and early adult life. Each dental surgeon should ponder these points well. Each parent he sees should be told of them in no half-hearted way. Faults in children's teeth should not be blinked out. They should, rather, be sought out, remembering that we are not only saving the patient much pain and ill-health, but actually sparing them the need of artificial dentures in days to come, and the risks necessarily incident to the wearing of these.

News and Notes.

MR. W. A. HOOTON has been appointed Hon. Dental Surgeon to the General Hospital for Sick Children, Manchester.

MR. A. J. MAKEPEACE has been elected Hon. Dental Surgeon to the Coventry and Warwick Hospital.

MR. J. PERCY SMITH has been elected Assistant Dental Surgeon to the Dental Hospital of London, Leicester Square.

MR. J. TREVOR HANKEY has been elected Dental Surgeon to the Brentwood Schools of the Hackney Board of Guardians.

THE First Social Meeting of the Three Towns Dental Society was held at Plymouth. on Wednesday, Feb. 14th, when there were present Messrs. Hambly (President), Balkwill, Brittan, Geldard, Maw, Mayne, Overell, W. Sexton, Sleemin, Taylor, and Mountford (Secretary). Considering that this was the first meeting of the kind ever held in Plymouth, it was a decided success. Various topics of professional interest were started and will be continued at future meetings,

WE learn from a paper by Dr. Kerr, of Canton, that the Chinese show special aptitude in the mechanical part of dental work. His description of native mechanical methods, which they have been using for centuries, is very interesting. He says: "Utilising the femur of an ox, and sawing a circle of half or three-quarters of an inch from the shaft, a section of this circle is used sufficient to fill the vacant space in the mouth. The section of bone is then dressed with a file, so as to imitate the teeth to be replaced, and through holes drilled in each end, copper wires are passed, to fasten it to the adjoining teeth. These artificial teeth are designed more for good looks than for purposes of mastication, and since the cost of inserting three or four teeth amounts to about twenty-five or thirty cents, this means of remedying uncomely defects is within the reach of all."

THE Annual Meeting of the Subscribers to the Glasgow Dental Hospital was held in the Religious Institution Rooms, Buchanan Street, on January 31st, Sir James King presiding. The annual report stated, that this year's record was one of marked improvement in the prosperity of the hospital. A large increase had taken place in the number of patients availing themselves of the hospital, the number being 5,727, as against 4,237 of the previous year, being an increase of about 1,500. Last year, of the whole of the cases treated, about 25 per cent. were operations of a preservative character, while this year they amounted to close upon 40 per cent. of the whole cases. The improvement in the financial affairs of the hospital had been maintained. A large accession had taken place in the number of students, with the result that the income from students' fees, which last year amounted to £78 15s., this year was £160 13s. The accounts, which opened with a credit balance of £45 os. 1½d., closed with an increased credit balance of £179 os. 11d. In view of the expiry of the lease it had been resolved to make an effort to create a building fund, and take steps for raising subscriptions or donations thereto. The directors had set aside £100 of the credit balance as a nucleus of this fund. There was a slight increase in the public subscriptions and donations, the sum received being £100 14s. 1d., as against £97 7s. received last year. The treasurer's statement showed the income to be £369 12s. 0½d., and the expenditure to £190 11s. 1½d., the result being that the balance at the credit of the hospital had been raised from £45 os. 1½d. to £179 os. 11d.

AT a meeting of the committee of the Liverpool Dental Hospital, on March 2nd, Sir James Poole in the chair. The minutes of the annual meeting having been passed, it was unanimously resolved to re-elect Sir James Poole, chairman for the current year, and expression was given by the committee of their appreciation of the strong interest taken by him in the welfare of the charity and the energy which he had displayed in promoting it. Mr. H. C. Quinby was elected vice-chairman. Financial matters connected with the new alterations and extensions were afterwards considered, and donations towards the fund were reported, a hearty vote of thanks thanks being accorded to the donors.

DR. JOHNSON, of the *Dental Review*, says:—"Lubricate your discs and strips with vaseline or oil. It prevents pain by preventing

the heat caused by friction. It makes the discs more flexible, so that they can be more readily pressed into a given point, and in this condition it will hold the fine particles of gold on its surface, the dentist, who preserves his old discs and strips for a time, and then turns them over to a refiner for melting, will be surprised at the result." We would not only endorse these remarks, but suggest glycerine as being more pleasant to use than oil, and as being equally good. This should be kept in a drop bottle, or, even better, in a small oil can. One drop being placed on the disc before use.

At the Barrow Police Court, on March 12th, George Fred. Bamber was charged with not being registered under the Dentists' Act, 1878, and with using the description "Free Dentorium," thereby implying that he was registered under the Act or that he was a person specially qualified to practice dentistry and not being a legally qualified medical practitioner. Mr. D'Arcy, Barrister (instructed by Mr. J. Park), conducted the prosecution, and Mr. W. Williams defended. Mr. D'Arcy said the summons was taken out under the 3rd section of the Dentists' Act of 1878, 41 and 42 Victoria, chapter 33, and it was to the effect that from the 1st of August, 1879, persons should not be entitled to take the name or title of dentist alone or in conjunction with other words, or use the term dental practitioner, which should imply that the said persons were registered under the Act, unless the persons were qualified dentists under the Act, and that under another Act (1886), a private practitioner was permitted to prosecute in case the original Act was infringed. Those Acts were most important and beneficent ones. They were to see that men were qualified and went through a curriculum to make themselves efficient in a certain branch of science. They were also beneficent in protecting the public against those who were not qualified men. The defendant was a young man who carried on business at 217, Dalton Road, Barrow, and occupied the first floor of that building for his practice. He advertised largely, and over the shop there was a sign setting out that the place was a "Free Dentorium." He was not, however, registered under the Acts he had quoted. He asked that a suitable penalty might be imposed. Evidence was given in support—amongst others by Charles Greville, a dentist of Barrow, the plaintiff in the case—who admitted that he had advertised his business. Mr. Williams, for the defendant, submitted

there was no case, and quoted from the Act to support his contention. The action was under the Summary Jurisdiction Act, which said that cases of that character must be gone on with six months after the cause of contention was first discovered, and he submitted that Mr. Grevile had known of the action of his client for some eight or ten months before he took out the summons. His client had never set forth that he was a qualified dentist, and that the words "Free Dentorium" might mean anything. He had carefully abstained from calling into requisition any words or terms which might implicate him. No witnesses were called for the defence. Defendant was fined £2 and costs.

THE Annual General Meeting of the Dental Hospital of London, was held on March the 17th, at Leicester Square, Mr. J. Smith Turner being in the chair. The report of the Managing Committee shows continued success. The annual subscriptions having risen to £1,053 os. 6d., other amounts (including £196 18s. 6d. from the Hospital Sunday and Saturday Funds) bring the income of this Charity up to £2,358 8s. 7d. This is a decrease on the previous year, which is accounted for by special donations having been presented to the Building Fund instead of the General Fund. Messrs. Austen, Hare and Mellersh have been elected Honorary Life Governors as a recognition of their services in connection with the concert held on June 6th in aid of the Building Fund. During the year 55,325 cases having been treated. Extractions 21,963, ditto under nitrous oxide 13,448, gold stoppings 4,619, plastic, &c., 10,424, irregularities 326, crowns, &c., 305, miscellaneous 4,242. Mr. J. M. Nicol has acted as extra anæsthetist for the afternoon. Messrs. F. L. Dodd, H. J. Stevens, D. P. Gabell, F. Fennings, H. S. Prideaux, F. Kekwick, E. C. J. Hall, have acted as House Surgeons during the year, the present ones being Messrs. W. F. Mellersh, L. G. Austen, A. B. Densham, W. M. Jones, and J. A. Freeman. Dr. Hare has resigned his position as Chairman of the Committee of Management, Allen Stoneham, Esq., late Finance Secretary to the Board of Trade, has accepted the post, thus vacated. J. Smith Turner, Esq., being elected Deputy Chairman. Mr. Smith Turner's address will be found on page 185. During the meeting a cheque for £500 from Mr. Henry Harben was handed in making over £10,200 promised and received towards the New Building Fund.

THE Tenth Annual Dinner of the Edinburgh Dental Students' Society was held in the large saloon of the Imperial Hotel, on the evening of March 8th, when over seventy gentlemen were present. Dr. Wm. Craig, the Honorary President for the coming session, occupied the chair, while Mr. Sewell Simmons, L.D.S., the President-Elect, and Dr. Fred. T. Turnbull L.D.S., the retiring President, acted as croupiers. On the right of the chairman were:—Mr. W. Bowman Macleod; Mr. Dall, L.D.S., Glasgow; Mr. Ivison Macadam, F.R.S.E.; Mr. Stewart Durward, L.D.S.; Dr. Noël Paton; Dr. Afflech; and Dr. Miles. And on the left were:—Mr. Andrew Wilson, L.D.S.; Mr. Biggs, L.D.S. Glasgow; Dr. Matheson-Cullen; Mr. G. W. Watson, L.D.S.; Dr. Farquharson; Dr. Basil-Orr; Dr. Macdonald Brown; and Mr. T. Dilks Page, L.D.S. South Shields. Letters of apology and good wishes were read from Dr. John Smith, Professor Johnson-Symington, of Belfast, the various dental student societies, many past students, and a pleasant telegram received from the lady dental student. After an excellent dinner, and after the loyal and patriotic toasts had been duly honoured, the Chairman, who was enthusiastically received, proposed "The Edinburgh Dental Students' Society," which was replied to by Mr. Sewell Simmons, L.D.S.; other toasts being "The Incorporated Edinburgh Dental Hospital and School," proposed by Dr. Macdonald Brown, and responded to by the Dean and Mr. Andrew Wilson; "The Edinburgh School of Medicine," proposed by Mr. G. J. Goldie, L.D.S., and replied to by Dr. Noël Paton and Dr. Miles; "The Guests," proposed by Mr. Robert Lindsay, with replies by Mr. Dall, L.D.S., and Mr. W. G. Stevenson, A.R.S.A.; and "The Chairman," by Mr. J. K. Mackintosh. The toasts were pleasantly varied by an excellent programme of music, provided principally by the students, headed by Mr. J. Douglas Logan, who has again proved himself an efficient accompanist and able soloist. Songs were rendered by Mr. David Munro, L.D.S.; Mr. Goldie, L.D.S.; Dr. Fred. Turnbull; and Mr. Coleman; with instrumental selections by Messrs. Nash and Duncan, violin, and Mr. J. Morris Stewart, mandolin. The guests vied with each other in their efforts to entertain the company, and it would be invidious to single out any individual performance where all were excellent. Humorous recitations were given by Mr. W. G. Stevenson, A.R.S.A.; Dr. Macdonald Brown, and Mr. Imrie, who gave an original experience of a visit to the Dental Hospital, followed by banjo solos

and songs by Messrs. Glen and Watt, and selections on the bagpipes by Pipe-Major Macdonald, the janitor of the Dental Hospital. Altogether the evening was one of the most successful yet held by the Society, and will do much to bind the many friendships formed in student days.

WE have been favoured with a copy of the menu card and toast list designed for the above dinner by Mr. F. Page. Certainly these cards are beautifully executed, and we can only marvel at the humour and ingenuity with which the gentleman is able year by year to provide such excellent amusement as these afford.

THE Annual Meeting of the Devon and Exeter Dental Hospital was held on March 27th, at the Exeter Guildhall, under the presidency of Mr. George Franklin. There were also present the Mayor of Exeter (Mr. E. J. Domville), the Sheriff of Exeter (Mr. A. W. Buckingham), Mr. G. A. Townsend (hon. secretary), and others — In their fourteenth annual report the Committee of Management observed that they were still anxious as to the future financial position of the institution. There had again been a considerable increase in the number of patients treated, and also of operations performed during the year, and the committee could not but reiterate their expression of appreciation of the work done as shown by the large augmentation referred to. The receipts for the past year had been £220 9s. 10d. (including fifty guineas, five life donations, and twenty guineas pupils' fees), and the expenditure £58 5s. 8d. In response to an appeal by the president there had been five new life donations, one general donation of £5, three and two general donations of 10s. each; one new annual subscription general donations of one guinea each, three general donations of £1 each, of five guineas, thirteen new annual subscriptions of one guinea each, and thirteen new annual subscriptions 10s. 6d. each. The committee again referred to the continued assiduous and valuable services rendered by the whole staff. The medical sub-committee reported that during the past year 3,636 patients were treated (an increase over the previous year of 388), while the number of operations reached 5,299, an increase of 717 over the number shown in their report for 1892.

ALL will rejoice to hear that an exceptional honour has fallen to the lot of the genial Berlin Professor, Dr. Miller. He has been appointed Professor Extraordinary in the Medical Faculty of the Royal Friedrich Wilhelm's University of Berlin. This honour, it is said, is but rarely conferred on anyone who has not gone through all the medical examinations at a German University. The last similar appointment was in 1882, when Dr. Creger Baumann was elected Professor of Physiological Chemistry.

THE *Southern Dental Journal* says:—"That the discoloration produced by nitrate of silver can be easily removed by an application of iodide of potassium manipulated with soft pine or orange wood stick and pumice.

DR. KINGSLEY writes in the *Cosmos*:—"It has been generally supposed that a child with a congenital cleft must wait until the jaw and alveolar arch were pretty fully developed, or until about the twelfth year of age, before it was prudent to apply an artificial palate. I favored that idea myself many years ago, partly because I wished to avoid the annoyance to which the child might be submitted, and partly to save the expense of a second apparatus when the child should become older. But the experience of many cases since has convinced me that my hesitation was a mistake. The advantages gained by an early interference far outweigh any financial consideration, and I find that children become accustomed to the presence of such a foreign body quite as readily as adults. The benefit to be gained by preventing improper efforts at articulation from becoming fixed habits, as well as the greater ease with which habits already formed can be broken up, must be manifest to every one. Children adopt involuntarily the tone of voice, accent, and peculiarities of utterance of those with whom they are associated, and I am satisfied that perfect results are attained more rapidly and with less effort by supply an artificial velum early in life."

Journalistic Selections and Abstracts.

LINING RUBBER PLATES WITH GOLD.

By DR. DALY.

THE plaster model must be a correct one, and its surface free from air bubbles. The case is proceeded with as usual until it is flaked.

Where the teeth, or any of them, rest on the gums, they should be invested to remain in the lower part of the flask. *All air-chambers should be made of plaster and free from sharp edges and corners.*

1. Separate the flask ; remove wax, etc., preparatory to packing.
2. Varnish the model with sandarac varnish, and allow to dry.
3. Apply a coating of *dammar* varnish, and wait until it becomes very sticky.
4. Cut the gold lining in pieces to suit, and apply it as you would a postage stamp, allowing each piece of lining to slightly overlap the edge of the other.
5. The brown surface of the lining must be kept perfectly clear of varnish, or it will prevent union.
6. Pack with small pieces of rubber.

The flask being separated and the wax removed, cut plenty of vents for the surplus rubber to escape, then cover the model with gold lining (the bright side being next the model). Cut into pieces of such shape and size as to avoid creases and wrinkles. If an air-chamber is used, *that* should be covered first, extending about a sixteenth of an inch beyond its margin all around ; then lay a strip along the back part of the model, cover the alveolar ridge, extending the lining slightly beyond the edge of the plate, and, finally, the remaining space, and press with some soft substance into all the inequalities. Each piece should slightly overlap the adjoining one. Where there is a depression, the lining should be pressed with a suitably shaped piece of rubber eraser or the finger to the lowest point first, and then fasten. Instruments should never come in contact with the brown side, as they damage the crystals. Where the teeth rest on the gums, pieces of lining can be slipped under the teeth.

Pack in the rubber carefully and exactly, close the flask, and vulcanize. In closing the flask, be careful to bring the two parts together slowly and evenly. After vulcanizing, remove the laps with a burnisher or other blunt instrument in the direction which they run, finish with burnisher and soft brush with a little Spanish whiting.

In repairing broken plates, if any of the lining is cut away, replace it before packing with fresh lining ; if none is cut away, nothing need be done.—*Cosmos*

PRODUCTION OF GUTTA PERCHA.

By GEORGE RANDORF.

To obtain gutta, the inhabitants of Malaysia (a group of islands south of Siam, and seat of the recent Franco-Siamese controversy) continue destroying the valuable trees yielding this juice. The sad consequence of this barbaric method has attracted the attention of the French government for some time. A scientific expert has been commissioned by France to investigate the subject, and suggest, if possible, less destructive means of obtaining it.

Dr. Sérullus, the commissioner, thus describes the ways of the Malays: After felling the chosen tree, they cut off all branches, as the leaves continue to draw from the trunk the juice containing gutta; they then make several parallel incisions in the bark, which convey the liquid to small cavities at the end, where the contents are deposited, coagulating almost immediately. These deposits are placed in boiling water and beaten with wooden mallets. The raw gutta is made into loaves and delivered to the Chinese merchant. The quantity of gutta obtained from a tree thirty years old is about 265 grams.

By this process 3,144,847 kilograms of gutta were exported to Europe in 1884, which would necessitate the destruction of 12,000,000 large trees. The tree itself is capable of propagating its species at the age of thirty—*i.e.*, just about the period it is considered ready for the axe. It is evident the extinction of this whole species is only a matter of time. Indeed, the quantity of exported gutta has been diminishing since 1884, while its price is rapidly rising from nine francs per kilo in January, 1889, to seventeen francs in July, 1891. The production diminishes, but the consumption is increasing.

Dr. Sérullus succeeded, by a chemical process, in obtaining more kilos of gutta from a live tree than the natives did by destroying it. The vegetal debris, consisting of dried leaves are pulverized and suspended in a solution of toluene. At the end of a few hours, after the gutta is dissolved in the toluene, the whole is thrown into a draining-vessel on a cotton filter; after the filtering of the toluene, the remainder is lixiviated with tepid toluene. A toluenic solution is obtained, thick, sticky, and colored in green by the chlorophyll.

To separate the toluene from the gutta, a current of vapour is passed through the toluenic solution at 100°, one part of vaporized

water carrying off three or four parts of toluene. The green color may be eliminated, but it does not affect the quality.—*International Review.*

HYPNOTISM.

By Dr. CARL HEITZMANN.

I AM not guilty of having hypnotized any one except my canary bird, and that is done very easily. It is a nice bird, and I hold it in my hand, put my finger on its forehead between the eyes, and in half a minute I can do anything with it.

This hypnotism is a wonderful thing, and has been used and misused for thousands of years. Of all explanations that I have heard or read about the philosophy of hypnotism, one has struck me forcibly as being the best and that is the explanation of Professor Heidenhain, of Breslau, Germany. What the essayist told us is largely metaphysical; the ego and the automatism of the brain, I must say, I do not like much. It only explains one puzzle with another. Heidenhain says it is the exclusion of the large brain from activity. Since the wonderful discoveries of Meynert, of Vienna, we know we have in our brains three successive centres of gray matter. Heidenhain claims that the largest and most extended center of the cortex is made useless in hypnotism; that is, everything we call will, energy, observation, is cast off, and a hypnotized person becomes an automaton, because only the deeper centers come into play, much the same as in hysteria, to which hypnotism is closely allied. There is a good deal of probability in this explanation; but how it is done nobody can tell. It is a puzzle indeed. This much seems to be certain,—that the more the nervous system is weakened by sleeplessness, suffering, sorrow, or care, the easier it is to hypnotize the person. I wonder if anybody can hypnotize me? I doubt it very much. The greatest experimenter in hypnotism was a Frenchman. There is a good deal of fascination about it, and the French, being of excitable nature, made use of it. A story is told that a young medical student in France hypnotized his sweetheart, who had come to his rooms, and went out, forgetting all about it. Twelve hours afterwards, he went back. The young woman, after being awakened, gave him a hearty box on the ears. She said "Will you starve me to death? How dared you to forget all about me?" He had to marry her as a punishment.

There was a physician in one of the French hospitals who hypnotized his patients and suggested to them, most of them being very nervous girls. He had several vials, holding certain chemicals or medicinal substances, and gave an exhibition of the effects of suggestion. He simply held the vial before the patient, and when the vial contained valerian, which is a favourite with cats, the patient began to purr and mew? when strychnia was placed before her, the patient had cramps, and commenced to writhe. Now Dr. Hart, of London, was present, and asked permission to repeat these experiments. He took the same patient, but was wise enough not to suggest anything. He held the bottle of strychnia before the patient, who immediately began to purr and mew, and when he extended the valerian the patient began to get cramps. Of course all was a humbug. They were not instructed by the doctor, but they heard him say what it was, and they repeated these things in a hypnotized condition. Such things as hypnotism and suggestion do exist. Some years ago a man made public exhibitions in Vienna, and the outcome was that the government forbade all such experiments and drove him out of Austria.

An excellent psychologist, Professor Meynert, whom I mentioned before, positively stated that hypnotism is to be forbidden because it weakens the brain, and every experiment in this line will be punished by the inclination of the patient to become more easily hypnotized thereafter, and fall into hypnotism at the least opportunity. That was his conviction, and now I turn to the essayist and ask him if he is perfectly sure that this hypnotism is an entirely harmless affair? If a man like Meynert, who was a personal friend of mine,—a really good, thoughtful man,—says that hypnotism is not an exactly criminal, but an untoward thing, will other people utilize it for making a dental operation painless,—something which can be done nowadays with comparatively easy methods, using locally hot chloroform vapour, for instance, as Dr. Bödecker tells us?

Once more, the great objection is (aside from the misuse which, of course, is out of the question here),—first, not everybody is fit to be hypnotized; and second, if there are thoughtful minds which claim that hypnotism is objectionable, rendering the patient susceptible to all outside influences,—will the essayist, in the face of these facts, maintain what he said at the beginning of his otherwise, admirable paper, that hypnotism will become a feature in the office of every dentist? Permit me to doubt it.—*Cosmos*.

THE RELIEF OF PAIN FROM DISEASES OF THE DENTAL PULP AND PERIDENTAL MEMBRANE.

By A. W. HARLAN, M.D., D.D.S., CHICAGO, ILL.

THE dental pulp is a frequent cause of pain after near or actual exposure of its surface to external agencies. When the pulp is exposed by accident the pain is easily relieved by protecting it from the air or moisture with chloral camphor, phenol camphor, oleate of cocaine, melted carbolic acid or other local anæsthetic. The surface should be dried if possible before making the application. A mixture of collodion and carbolic acid, ten or twenty per cent., will serve as a temporary dressing. Twenty parts of carbolic acid, five parts of the hydrochlorate of cocaine and seventy-five parts of liquid glycerine will arrest pain from exposure of the pulp. I have frequently used twenty parts of a four per cent. solution of cocaine, thirty parts of pure oil of sassafras and fifty parts of melted carbolic acid as a local covering. This is only slightly caustic or escharotic. The bottle should be shaken before using when the mixture is fresh. The pain from a hyperæmic pulp is quickly relieved by puncture, when possible, if not, torsion will sometimes relieve the pain. Remedies administered internally for retarding the circulation will seldom be effective in relieving the hyperæmic condition. Sometimes when torsion is practiced the addition of counter-irritation may relieve the pain. When the pulp of a tooth has been capped with any material before it is in a normal condition, there may be pain continuous or intermittent. Should this continue in spite of torsion or counter irritation the filling must be removed. Even this will not always relieve the pain and the pulp may have to be destroyed before the pain will cease. Of course it is understood that a pulp should, not be capped when irritated or inflamed, but many pulps are capped in this condition and the only salvation for them is to remove the capping.

The pain from a pulp where calcification of its substance is going on cannot be relieved permanently save by destruction of the organ. If the patient can endure the pain in a course of time the pulp will be obliterated. Usually the patient will not endure such agony for very long and unless relief is afforded the tooth will be extracted by some other dentist.

The pain from congestion of the pulp and the formation of pus in its substance can only be relieved by getting direct access to it and pricking it to relieve the overfull vessels. After the tension has been relieved the pain does not always cease. It has been a favorite method with me to wash the cavity with peroxide of hydrogen at once and quickly dry the cavity; apply pure chloroform on cotton, then melted carbolic acid. In five or ten minutes the patient will be comfortable. It is my theory to destroy the pulp if there is no probability of saving it. I might attempt to coax it back to health if it were an exposed front tooth in a young person's mouth. There are few cases where it is possible to retain the vitality of a pulp after suppuration of a small portion of its substance. The mere puncturing of a pulp with a sharp pointed instrument to relieve congestion or hyperæmia is not always sufficient reason for the destruction of a pulp unless the vital powers are low or the patient is past fifty years of age; then the recuperative forces may not be sufficient to enable it to live under a capping. Drying the surface of a suddenly exposed pulp and painting it with collodion will arrest pain. When the pulp is dead and the pain results from pressure of pus beyond the apex, the manifest duty of the surgeon is to give it exit, through the root canal or by drilling into the alveolus through the process. If a simple pericementitis has to be dealt with, calcium sulphide 1-10 gr. pill every ten minutes until six have been taken will ordinarily arrest pain. Prior to this an aperient may be administered. Citrate of magnesia, a Seidlitz powder, Hunyadi Janos, or some other internal remedy. Counter irritation, tincture of capsicum, cantharides, ammonia, chloroform, absolute alcohol or a metal disc of the size and thickness of a copper cent dropped in boiling water before using it. When there is a pocket alongside the root wash with pyrozone, then inject into the pocket two or three drops of vinum opii or a twenty per cent. solution of menthol in alcohol or ten per cent. acid carbolic in liquid vaseline. Bathe the face in hot water, place towels or napkins on the face after dipping them in hot water 140° F. Keep changing them and relief will come. When the pulp is exposed at the apex destroy it.—*Dental Review*.

THE British Dental Association have accepted an invitation from Edinburgh to meet there next year. The meeting will be held in August.

AN ADDRESS. *

By Mr. J. SMITH TURNER.

GENTLEMEN,—Before the meeting becomes special, I should like, by your permission, to make a few remarks on the very satisfactory Report which has been laid before you, as in it is contained matter which not only tells us of the present condition of this hospital, but gives us a glimpse into the past, and also looks forward hopefully into its future.

Like most similar institutions, it has been subject to changes almost revolutionary in character. Its original formation was in itself almost a revolution in the established order, or disorder, of things dental; and it was looked upon with apprehension by many, and looked at askance by many more, who regarded it as an innovation dangerous to the interests of dentistry, and as unlikely to be of much utility either to the public or the profession. The experimental stage, however, soon passed away, and the London Dental Hospital became a permanent educational institution of the metropolis. As such, it could not long remain in its primitive form—for stagnation would then, as now, soon pass into deterioration; and so the growing requirements of the hospital became too much for the premises in Soho Square, a state of things which led some of the most active of the committee of management to seek out another site. When Leicester Square was named as the chosen place there was a fluttering of the dove-cots, which, however, did not last long, and ultimately changed into assent and substantial assistance to the new scheme. I think that it is not too much to say that this revolution in the hospital's history was mainly carried out by the great determination and generosity, and tact, of Mr.—now Sir—Edwin Saunders. Not contented with having effected this great change, Sir Edwin followed up his *grand coup* by leading the management in a continuous line of extension, and in one direction completed it by a gift to the hospital of what is known as the Tower building, and forms the eastern portion of our façade. It is to some extent satisfactory to think that neither Sir Edwin nor his colleagues could have foreseen the awakening amongst the poor to the necessity for dental attention which was to follow this movement, nor could they, in their most sanguine moments, have realised the success of their institution either as a hospital or a school when

* Delivered at the Annual Meeting of the Dental Hospital of London.

they removed it to the present site ; for, if they had, I think that they might have at once given it up, and sought elsewhere for premises, at once more accommodating and more elastic. Happily for us their prescience did not carry them so far, and so to them we are now indebted for being placed in a locality at once central and unique in its suitability for our purpose ; and when difficulties unforeseen sprang up, they were manfully met by adding house to house, and by utilising every inch of underground space, even to cellarage. But all in vain ; for, as soon as any little space was by ingenuity utilised, it was immediately swallowed up by the ever increasing tide of applicants for help. It was thus that the need of changes of a more decided and extensive character was forced upon us. The great progressive revolution initiated by Sir Edwin Saunders and his colleagues has not yet ceased ; it has only entered into another stage ; but this onward step has brought with it many important changes. Some of our old friends, our old trustees and our treasurer, appalled by our audacity, have one by one resigned, and others have been appointed. Further, and with the full approbation of the late Mr. Phillips, our Honorary Solicitor, Dr. Walker, one of our new trustees and also our new treasurer, was authorised, with the help of a competent legal adviser, to investigate the titles of the various properties held in trust for the hospital, and to place them in such a position as to make them available as material securities. I need hardly say that the results have been most satisfactory, and that the committee of management has been able to use the buildings to the advantage of the future of the hospital without any fear of embarrassment or confusion. Gentlemen, when I found that I had to take the Chair on this occasion, I came to look at the attendance book at the hospital, and the first day I examined showed me a record of 266 patients ; to this I added an average attendance of 70 students and 20 adults accompanying children, and 18 or 20 for the staff and ordinary attendants, and this gave me a total of 376 persons passing to and from, or spending the greater part of the day in the hospital. Now, although I hit upon a heavy day, and one above the average, I was assured that such an attendance was not uncommon, and when we consider that, as things go, it might become more and more common, I think we may safely say that it is our duty to prepare for this condition, rather than to wait until that which is meant to be a blessing becomes a crying evil amongst us. It is a well known fact

that the conditions for the spread of certain diseases are greatly aggravated when numbers of the poorer classes are brought together under the most favourable sanitary arrangements, and I think that it speaks volumes for the vigilance of our staff that this danger has hitherto been so successfully encountered. But, gentlemen, no amount of vigilance will suffice if we outrage the first conditions of sanitation by overcrowding badly arranged and badly ventilated rooms, and yet it is towards this condition that our hospital is steadily approaching.

It has been suggested that we should limit the number of our patients, but when we have opened our doors it is difficult, if not impossible, to limit the number of applicants for relief; and even if we are able to cut down the number of those whose necessities require a large expenditure of time and material, still that would go but a short way towards remedying the ever increasing evil, besides depriving the hospital of those patients who are most valuable for teaching purposes. Again, I think that while the power and will to do the work is available, it were a thousand pities to deny its advantages to the necessitous poor, for want of proper accommodation.

Further, the claims of the gentlemen who gratuitously give their time and skill to the work should not be overlooked, and it is certainly due to them to consider the arduous nature of their occupation and to provide them with proper sanitary and good professional and personal accommodation. If we look at the hospital report, we will see that our contributions for last year amounted to about £2,000, and that the number of cases attended to was over 55,000. Now, although we are sitting nearly rent free at present, yet it is obvious that even with that advantage the sum of £2,000 would do but little to meet the necessities of such a host of poor people, were it not for the gratuitous services of the staff and students which are available; and I seriously ask, would it be wise or economical to deprive the poor of such help, and to limit the number of patients because our premises, although at one time considered ample, are now quite inadequate to the demands made upon them? It was such considerations, amongst many others, which compelled the managing committee to instruct our treasurer, Dr. Walker, to secure for the hospital certain premises which are mentioned in the report. By his exertions, supported by our late chairman, Dr. Hare—whose resignation we all regret—and by our indefatigable secretary, Mr. Pink, the freehold of the greater part, and of the

most valuable portion of the block of buildings eastward of this hospital, and on the same alignment has been secured for the projected new hospital. We are thus carrying out the policy and plans of those, who in the face of much opposition, wisely brought us here.

Although there are certain conditions essential to all Hospitals, there are some which belong more especially to a Dental Hospital. Ventilation is, of course, a primary necessity, common to all; but a central position is of greater importance to us than to other Hospitals, for many of our patients have to come frequently, and sometimes on several consecutive days, and it may be from long distances. I think that we are placed in the most central part of London. Then many of our patients come and go quickly, and so for them there should be facility of ingress and egress—a matter in which we are now lamentably deficient with our passages used as waiting rooms as they are at present. Then, when people come through inclement weather, there ought to be some provision for a little attention to comfort before they give themselves up to what may prove a long and more or less fatiguing operation. In the interests of common humanity, the operating rooms should be well removed from the waiting rooms—far enough for the arrest of any sound passing between them, and the arrangements should admit of the patients' prompt removal from the operating room to a retiring room; and for an egress quite apart from the waiting rooms. Even a modest approach to these conditions are quite out of our reach in our present premises; in other words, our necessities have outgrown our surroundings. But above all, our primary necessity is an unobstructed, and, if possible, a northern light.

Now, in the south side of Leicester Square, we have found all we require in the way of space, we have no fear of Ancient Lights, and we have a northern aspect, which nothing short of an imperial revolution can destroy, and all within a few yards of our present site. We have also such opportunities of expansion, as puts another removal out of the question. So will the founders of our hospital leave a permanent home for their name and their fame in the Dental Hospital of London, Leicester Square—the title by which the hospital is now known. What is urgently wanted now is that the general public should take a practical interest in our efforts. It may be said that the number of cases treated last year shows that in one way they do this, but what we want, and what is absolutely

necessary, and what I think is justly due to us, is a sympathetic interest in the shape of monetary help. In looking over a list of subscribers to the building fund, I found that out of 412—exclusive of the City and City Corporations—more than half of them are immediately connected with the dental profession. We cannot call them all dentists, as some of them are still students. I also found that out of nearly £10,000 promised, our committee and the profession provided £7,249, the Corporation and City Companies £380, and the general public £2,091. Now, this is not as it should be. I do not mean that the subscriptions of the dentists are too large, but that the proportion of the general public appearing in the list, and the amount promised, should be so small.

We know that charity requires guiding, and that its impulses may be easily changed, and that in the present depression of trade, and in the face of the insane attempts to give a uniform and artificial value to labour by legislation which legalises idleness and penalises industry, the stream of charity is likely to run low and slow, but in an institution such as this, where pain is alleviated, and trouble promptly arrested which might otherwise extend into days and even weeks of incapacity, the charitable may find a safe depository for their gifts, for in whatever direction charity may go, it cannot go wrong in keeping men and women in health, and fit for their daily occupations. I might, did time admit, point out the advantages derived by the public from an institution which, year by year, turns out a number of educated gentlemen ready to serve them in an important capacity, and equipped for their profession to a degree quite unattainable in any other branch of the healing art. To the members of the general medical profession and to the public I would make our grateful acknowledgment of what has been done, but in the face of our pressing need, I must ask for more; and to our own specialty I would say, Do not let what you have done prevent you from doing more. Your generous donations have made many of you life governors, I know, but if you can still keep your names on the list of annual subscribers till such time as we have accomplished our present great object, you will further help the Charity for which you have already done so much. In conclusion, I congratulate the committee of management and the subscribers generally on the acquisition of Mr. F. A. Bevan, of the firm of Messrs. Barclay, Bevan, Tritton, Ransom, Bouverie & Co., as one of our trustees.

DEATH UNDER NITROUS OXIDE GAS.*

By JOHN ADAMS, F.R.C.S. Eng.

THE patient came to the dentist on Monday, February 21st, about 1.30 p.m., and had an hour previously partaken of a light lunch. After waiting half-an-hour, he was shown into the operating room on the first floor. He seemed in good health and wished to have a second right upper molar extracted whilst under gas. There was nothing tight about the neck, nor was there anything in his appearance to lead one to think he was not a fit subject for the anæsthetic. He had a small receding jaw, and a short thick neck, but no abnormal swelling of any kind which prevented his closing his mouth, as reported in *The Lancet* of the above date. An ordinary prop, attached to a strong fishing-line, was placed between the upper and lower central incisors. After taking three or four inspirations of nitrous oxide gas he took off the face-piece and said he felt nervous, but at his own request I proceeded to go on with the administration. His respiration was shallow but regular, and after taking about two-thirds of the ordinary quantity of gas the tooth was extracted quickly and without any difficulty; the respirations at once became irregular and the patient became more cyanosed, his muscles rigid, and after three or four respirations, he ceased to breathe, but no danger appeared imminent. Breathing not continuing, the prop was at once removed, the patient taken from the chair on to the floor, and artificial respiration commenced within thirty seconds after the extraction. The tongue was pulled forward. The heart was beating regularly but not strongly, the body remained rigid, and there was no inspiratory effort. About two minutes after the tooth was extracted, two or three expirations took place, showing there was no considerable obstruction in the larynx. Nitrate of amyl was applied to the nose and mouth; but as no inspirations took place it could not have affected the patient. A subcutaneous injection of ether was given over the præcordial region, as the action of the heart now became feeble. These measures failing, tracheotomy was performed within three minutes of the time the gas was discontinued to be administered; the position of the patient was awkward for the operation, and the extremely receding lower jaw, with a short thick neck, made it somewhat difficult to perform, but as everything was at hand and ready assistance given, I fortunately made an entrance through the upper

*A Paper read before the Society of Anæsthetists on March 15th, 1894.

rings of the trachea without loss of time. The tracheal wound was kept open, and on resuming artificial respiration a quantity of mucous (about an ounce) was forced out, nearly clear and only slightly blood-stained. Although one could hear air passing in and out of the opening in the trachea there was no voluntary effort of breathing from first to last. The patient now became still more cyanosed, and the heart could no longer be heard beating. Artificial respiration was continued for twenty minutes longer, although there was little hope of its being of use. Micturition took place after the commencement of taking the nitrous oxide, a symptom which I have not infrequently noticed when cyanosis becomes well marked, and also in children. I will recapitulate shortly the methods adopted to restore respiration: (1) artificial respiration within half-a-minute after the patient ceased to breathe, (2) nitrite of amyl within one minute after respiration ceased, (3) subcutaneous injection of ether within two minutes after the patient had ceased to breathe, and (4) tracheotomy within three minutes after the patient had ceased to breathe.

The necropsy was performed by Dr. Norman Moore, at the request of the coroner, twenty-five hours after death, in the presence of the medical attendant of the deceased and myself. Dr. Moore has kindly looked over and corrected the description of the morbid appearances. The body was well nourished and muscular, of a man about twenty-six years of age. The face, neck, and back were all deeply cyanosed; there was a mark of a recent tracheotomy wound. On removing the skull cap, which was unusually thick, venous engorgement was visible on the surface of the cerebral hemispheres; nothing abnormal was noticed in the cerebral substance. On opening the chest, the veins were noticed everywhere full of dark fluid blood. All the internal organs were healthy. The pericardium contained the normal amount of fluid. The heart was normal and the valves competent. All the cavities of the heart were empty, except a small quantity of fluid blood in the right ventricle. No clots were present. The lungs were engorged with dark fluid blood and were nearly airless. On opening the bronchi, the mucous membrane was dark in colour and engorged, and a quantity of thick mucus was found in all the larger bronchi. The trachea was also engorged, but contained less mucus. The upper three rings were divided. The larynx, tonsils, and tongue were removed together for examination. The larynx showed no swelling and very little engorgement, and contained no appreciable quantity of mucus; no foreign body or

abnormal substance was found. The tonsils showed old enlargement, but did not meet in the middle line. The stomach contained a small quantity of undigested food, with a good deal of ropy mucous. The œsophagus was normal. The liver, kidneys, and spleen were all dark in colour, showing venous engorgement, but without any signs of disease. The bladder was empty. *Dental Record, London 2,*

DR. GEORGE JOHNSON in a letter to *The Lancet* says:—Mr. Adams appears to have promptly resorted to the methods usually adopted to restore respiration in such cases. Nitrite of amyl was applied to the nose and mouth, but as no inspirations took place the vapour did not enter the lungs and therefore, as he says, could have had no effect. It might be well in similar circumstances to inject a few drops of the liquid under the skin. Its action in such cases is that of relaxing the vaso-constrictors and so removing or lessening the impediment to the pulmonary circulation. The influence of this agent was well shown in an experiment. There is yet another remedy which might with advantage be resorted to in similar circumstances, and that is *venesection*. Dr. John Reid, in an interesting paper "On the Effects of Venesection in Renewing and Increasing the Heart's Action under certain Circumstances," has shown by experiments on dogs and rabbits, that when, as a result of apnœa, the contractions of the heart have nearly or quite ceased in consequence of a paralysing over-distension of the right cavities, they may be increased or renewed by opening the external jugular vein, and thus, by a reflux of blood from the heart, enabling the distended right cavities to become disgorge. This evacuation of the distended right cavities may occur even after death, from an accidental wound of one or more large veins in opening the chest. Thus Dr. Sutton, with reference to the distension of the right cavities of the heart which is always found after death in the collapse stage of cholera, says, "When the large veins of the neck were accidentally wounded, as in the act of raising the sternum, the blood escaped from the veins and the right ventricle was emptied in two or three minutes." To a certain the relative amount of blood on the two sides of the heart after death from apnœa, or in the collapse stage of cholera, it is essential that the inspection be not delayed until, as Harvey says, "the blood has made its escape through various channels," and care must be taken to avoid wounding large veins, and thus allowing the blood to escape from the distended right cavities.

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YET ANOTHER PROFESSIONAL HOLIDAY.

The World's Columbian Dental Congress.

BY GEORGE CUNNINGHAM.

(Concluded from page 56.)

"THERE was shaking of hands and sorrow of heart, the hour was approaching when merry folks must part," but happily not all of us. After the ball, sleep ; after the Congress, rest. The friends from abroad were well looked after, in little friendly groups, by the hospitable friends at home. Our Albion Syndicate, now reduced to two, were spirited off to the wilds of Calumette Heights by the still beaming Secretary-General, who evidently wanted to impress the Arabian Night's aspect of Chicago, with its teeming population, deeper in our minds by giving us a taste of primitive life within a hundred, aye, a quarter hundred, miles of Aladdin's Palace on the lake. After a two-hours' rail and a half-hour's waggon ride over the sand, we reached the Club House on the lake, in company with another mis-conducted party, in whom we recognised old travelling companions, Drs. Mitchell and Rathbone, under the care of Dr. Davis, of Chicago. Early to bed and late to rise was our immediate purpose. Our own party secure in the isolation of the Founders' Cottage, slept as we had not slept for nights, till the early man from the Club over the way, who couldn't sleep himself, wandered round, discovered our open door, and wantonly wrecked our blissful rest. Under a volley of little short words of Saxon origin, he disappeared ; but the

spell was broken, and much earlier than hoped for, we were afoot. Pyjamas were exchanged for bathing suits and sand slippers, and soon we revelled 'midst the breakers in the lake. Our swim and the prescription of our host compounded by the cottage dispenser made the tinkling of the bell which summoned us to the Restaurant Pavilion doubly welcome. If a very merry, we were also a very funny-looking party, accoutred in the rough and nondescript garments kept at the Club, for no town clothes were allowed. The Club is both a fishing and a shooting club, so as we could fish neither in the lake nor in the river under the broiling sun, we lazed on the verandah and improvised an international target-shooting expedition. We had the usual Sunday 24 pp. papers. Talking of papers reminds me of the great contrast between the American papers and our own in the attention they give to the proceedings of important dental gatherings. The proceedings of the Dental Congress were but barely noticed in the Chicago daily or weekly newspapers, though there was much matter of real public interest. The American press might well imitate the excellent example of their British colleagues, who, by their excellent notices and leading articles, have rendered inestimable services in raising our profession in the estimation of the public.

No record of this Congress would be complete without paying a glowing tribute to the professional journalist. At no previous Congress, either of medicine or of hygiene, have the needs of the members been so ably and so amply met as at this last Dental Congress. There were gratuitous daily issues, of not merely one, but of three dental journals. The special issue of the *Dental Cosmos* extended to considerably over 400 pages; a fact which speaks for itself. Dr. Kirk, the able Editor of this journalistic *tour de force*, devoted his whole time and energy to his editorial work, and never once had the opportunity of attending a single meeting; and yet I should think he was about the only man who had a thorough knowledge of all that was transpiring. The only fault I can find with this extremely liberal provisional of literature, was that there was absolutely no time to assimilate the contents of the various journals as they were issued; and for this reason, I think, while admitting fully the superiority of the *Cosmos* issue, the shorter and more assimilable product of the *Dental Review* better met the daily requirements of the average member.

Discussing and dilating on such subjects made our laze on the verandah not entirely worthless, till we roused ourselves to an exploration of what we may call the Club Estate, which includes a good fish river and some four square miles of shooting, well wooded and bordering on Lake Michigan. After dinner, we filled up the rest of the day shooting clay pigeons and the like. After supper the club wagon carried off the bulk of the members in time to catch the last train to town. Happier we who could return to enjoy the cool evening on the verandah by the lake and indulge in programme building, for we still had much to see. I had a personal disgrace to wipe out for everybody, not a dentist, whom I met, naturally asked me what I thought about the World's Fair. So far I could lay no claim to having seen it. It was rank heresy in Chicago to admit that, after having been more than a week in the city. Turning over the official guide to the World's Columbian Exhibition which I found lying on a table in the Cottage. I was much interested in a short paragraph as to the origin of the idea as to an exposition, which stated that it was claimed by others, but should be credited to Dr. A. W. Harlan, a dentist of Chicago, who first proposed it in a letter written by him to the *Chicago Times* in 1882. The following quotation from the *Chicago Evening Post*, of July, 1891, commenting on Dr. Harlan's letter is a recital of facts of which both we and he may be proud. "Undeniably this is the earliest suggestion made public. The idea of a World's Fair came to Dr. Harlan as he sat at the banquet board at one of the annual feasts given by the St. Andrew's Society. He had just returned from the International Medical Congress in London, and was turning over in his mind the feasibility of having a similar dental congress in Chicago. Dr. Harlan is a dentist, let it be known. Simultaneously with the thought of the dental congress came the broader idea of holding a World's Fair, and out of the two fancies came the proposition quoted above his signature. While every one was laying claim to the title of having originated the suggestion for the Fair, Dr. Harlan hung back. Obtrusiveness is not highly regarded in his profession, and besides, he is naturally inclined to modesty. But though he held himself in check when he might have gained much renown, he did not act so shyly when his dream had become a living reality and every one was booking, seeking or presenting subscriptions for stock. Then he showed that he was something

more than a visionist, for when he, with Drs. Allport and Cushing, was put on the committee to solicit the aid of the Dental profession, his books disclosed the fact that he had squeezed \$15,000 out of his brethren, which sum distanced that subscribed by any other profession in the city.

"Just at present Dr. Harlan is interested in the formation of the world's dental congress. He starts for Europe, August 8th, to induce the British Dental Society to join hands with the Societies in France, Canada, America, and other nations which have signified their willingness to co-operate in the congress."

After toasting our host as originator of the Fair, and as Founder and President of the Calumette Heights Club, we retired at an hour which ensured several hours of so-called "beauty sleep," a kind we did not often get a chance of sampling during our American visit. After a morning swim, our host prepared to return to his normal life at the Chair without another day's delay. It is wonderful how patients will wait when they must; and it is still more wonderful how we dentists differ in our definition of "must." We were too far away from home to bestow even a thought on the poor neglected patients, and set about enjoying our well-earned leisure in various ways.

First, there was the Fair itself—magnificent, unique, and inexhaustible—where we passed many pleasant and instructive days and pleasant evenings. It would be out of place to discuss the wonders and the attractions of the World's Fair in these pages, but I may be permitted to allude to one or two subjects of dental interest. In wandering round the very interesting series of State buildings, we chanced to enter that of Maryland; in the reception room there was an exhibit of some beautiful *repoussé* work, which to us proved of special interest, inasmuch as it was designed and executed by Dr. Volck, the well-known dentist of Baltimore. Three large shields respectively entitled, "Elaine," "King Arthur," and "Cortes," and "The Seigfried" Cup showed, not merely manipulative skill, but art creative powers of a very high order.

The exhibition of the Dental manufacturers was not so extensive as one might have expected. We were very much interested, however, in several new chairs, notably the "Columbian" and the "Harvard," and in a special exhibit of dental instruments for veterinary dentists. Our curiosity was somewhat stimulated by one

exhibit which seemed to us to have a curiously familiar appearance ; it was unmistakably English and not unlike the product of what is known familiarly amongst us here as "The Company," and therefore seemed masquerading under the title of "English Dental Specialities Company." There were no dentists' exhibits as far as we saw, but one of our French *confrères* discovered in the Russian Section a case in which a dentist exhibited several artificial dentures, and as he well remarks "The best we can do is to say nothing about it."

In the section of anthropology we renewed our acquaintance with the marvellous collection of Dr. Martin, of Lyons. It was very badly placed, and I am afraid was visited by very few members of the Congress. It was a great pity that this wonderful and unique collection was not brought more prominently before the Congress. The collection of human skulls and teeth made by Mr. Ward of Rochester, N.Y., was the most complete series for teaching purposes which we have ever seen. It seemed to me that Mr. Ward, unlike his colleague Mons. Trammond, had availed himself to considerable purpose of the advice of the dental expert. This is as it should be, and I expect is a feather in the cap of Dr. Barrett. We were much interested, naturally, in the exhibits of the manual training schools, and in running through the education exhibit came across that of two dental schools—the dental department of the University of Harvard and the dental department of the University of Michigan. It is needless to say that there was absolutely nothing unethical in these exhibits, and that they formed a very interesting part of the general exhibits of each university.

World's-fairing was hard work and tiring, so our days were pleasantly relieved by a series of drives through the wonderful boulevards and parks of Chicago ; other days we spent in interesting professional visits. What could be more instructive, for instance, than a morning spent with Dr. Case, who is a specialist amongst specialists, since he confines his practice entirely to the treatment of irregularities—it would take the whole article to do justice to that visit alone. Another well spent morning was that devoted to Dr. Haskell and his interesting school of mechanical dentistry. One of our countrymen did even better, for he took the opportunity of going through Haskell's course, as well as the post-graduate course at the Chicago Dental College.

My hobby, an Institute of Dental Technology, gave an unwonted interest to my visit to the Chicago Manual Training School, where we were fortunate to find an exhibition of the work of the boy-students. It was simply astonishing to note the progress made in drawing and shop work, not by a few but by all the boys, in their three years' course. A graduation certificate from such a school, including, as it does, mathematics, science, languages, and literature, would, in my opinion, form the very highest qualification for matriculation in a dental college. I hope that a son of the Secretary-General will justify that opinion in 1896.

In one of these morning rambles I ran across a very interesting personage in Dr. John Rabe, of Oakland, Cal., who is a veritable professional tramp and glories in it. His collection of photographs and models were both of ethnological and dental interest, an account of which I cannot do better than quote from the *Dental Review*:—"He has brought from Sumatra several very interesting models of the teeth and jaws of the Battock aborigines from the mountains of the interior, showing their customs of filing off the twelve anterior teeth even with the gums and inlaying the stumps with mother-o'-pearl and gold and silver. One of these models is from the mouth of a man who did the inlaying of the mother-o'-pearl himself in his own mouth, and the work from a mechanical standpoint is beautifully done. Another specimen is a model of the upper jaw of Tomassesse, the ex-king of Samoa under the German invasion. Dr. Rabe cleaned this king's teeth, and in order to get the impression was obliged to tell him it was part of the operation. He was obliged to bribe the other natives, and then had hard work to keep them from backing out, as they were afraid something might happen to them from the great spirit. The model of the ex-king's mouth is a monster in size, measuring over five inches, and has the sixteen teeth in a perfect condition."

And so the weeks flew by, but at last, after nearly a month, I was obliged to bid adieu to Chicago and all our hospitable friends. The following day I spent very pleasantly at Detroit, visiting a new Dental School there, which is practically incorporated in the same building with the Medical School, under the guidance of Dr. Field, while at Mr. Caulkin's Dental Dépôt I discovered the Moore system of engine discs, by far and away the best of its kind. That club lunch, that lovely drive, that charming dinner, will long remain as

a good example of that friendly hospitality which the American dentist seems ever ready to extend to his professional brother on tour.

After another glorious day at Niagara, where I was joined by Dr. Barrett, for the first time in my journey it really rained, and so badly that we hurried off to the not distant friendly shelter of his house in Buffalo. My stay there was all too short, but we found time to examine very thoroughly the new Dental Department of the University of Buffalo. The school is well equipped, not only with buildings and appliances of the most modern type, but best of all with a good teaching staff. It is not surprising that the success of the School has been so marvellous.

A merry farewell dinner with my Buffalo friends, a cordial "auf-wiedersehen," a troubled night in the cars, and then the familiar landmarks of dear old Boston, brought back light and colour to many a half-forgotten reminiscence, some happy, some sad, of student days some twenty years ago. Like a dutiful son of my dental *alma mater*, one of my first visits was to the veteran Dean of the Harvard Dental School, whom I found sorely stricken with the serious after-effects of influenza. He was full of kind enquiries for all his British graduates, and anxious to know when we were going to send, for the library of the School, the long-looked-for series of the Transactions of the Odontological Society of Great Britain. If any kind reader can help me to acquire a set, he will be conferring a favour on many.

Naturally our conversation turned upon the action of the General Medical Council in suspending the recognition of the Harvard University dental diploma, after having recognised it for years. I understand that the Harvard dental faculty are of opinion that the University has not been treated with even ordinary courtesy in this matter. It is true that the diploma was added to the Council's list of qualifications, but not in consequence of any request from the Harvard authorities; but, is it not somewhat invidious to strike it off without a word of communication, more especially as the statements, on which the Council's report was based, contained several inaccuracies and uncalled for misrepresentations.

Much is made of the fact that the course of professional study must extend over four years, while the best American schools only require three years; it is forgotten that private pupilage is no longer recognised as an equivalent for any part of the college course

in such schools, and, therefore, some of the most intelligent American educationists hold that ours is but really a two years' course.

Undoubtedly, the preliminary examination is the weak part in the American curricula, but the competition is not, as alleged by the English memorialist, working in a downward direction, as may be seen by reference to the proceedings of the National Association of Dental Faculties.

As the Council report rightly puts it, so far as the interests of the public are concerned, the question involved is not at present of great importance. It is a little piece of class legislation, instigated by a few, and is partly a formidable and effective reply to the hasty and erroneous assertion in America that the British dental schools are "cheap replicas" of those in America.

Another factor was the discovery that a certificate of naturalisation may be obtained in America without complying with the five years' residence required by the U.S. laws. It was not generally known that the diplomas of Harvard and Michigan entitled only foreigners and not British subjects to immediate registration. Such an anomaly is removed for the present. It will almost certainly help the cause of dental education in the United States, but it is a loss for the present to this country of a healthy infusion of a little good foreign blood, which has hitherto done good on the whole. Alas! It does little to keep out the bad.

I cannot do better than conclude by quoting the well considered remarks of my friend W. H. Coffin in his valedictory address as President of the Metropolitan Branch of the British Dental Association.

"The Medical Council has done well also, and given much satisfaction in the United States, by abolishing an invidious distinction between certain American Dental Colleges, which implied a wholly unmerited slur upon some of the very best diplomas and schools in that country. Professional sentiment in America will also entirely approve that qualifications should be denied recognition and registration in any country where they are considered unworthy of it. The relative suitability of differing methods of technical and scientific education directed to a definite result, must eventually be a matter of national temperament and local circumstances.

"Having said so much, may I humbly add, that in quite a different category will be placed by American opinion the action of

the Medical Council respecting a few individuals, who, relying on the great English equitable principle of non-injury by retrospective legislation, were refused a modest request.

"I have absolutely no knowledge as to whether our Association or the American qualifying bodies were consulted, or whether each case was considered on its strict merits; but, inasmuch as our register contains so overwhelming a proportion of absolutely unqualified names, the sudden exclusion without notice or a time limit of those who had innocently obtained a qualification considered worthy of registration for many years, seems contrary to the precedents hitherto regulating such procedure in this country."

My usual visit to Harvard College in the other Cambridge was rendered intensely interesting by Dr. Andrews taking me to see the remarkable "finds" of Copân (Honduras) explorations. The circular inlays of blue jade, beautifully fitted and firmly cemented in the front teeth over 1,000 years ago, and executed with bone tools or stone instruments obtained by chipping obsidian or chalcedony, were indeed a marvel. The prevalence of caries and the great accumulation of tartar disprove the contention that such inlays were made after death. I made notes and drawings for this article, but as Dr. Andrews' communication has already been reprinted in this journal, further comment is needless now.

An instructive afternoon examining Dr. Andrews' microphotographs and his new sunlight snap-shot method, and a pleasant evening in his very charming and musical family circle, did much to assuage the tortures of the a-teetotal traveller in a prohibition town.

Another red letter day in my calendar was my pilgrimage to Poet's Corner, the summer cottage residence at Beverley Farms of our dear old professor, better known to you less fortunate men as the "Autocrat of the Breakfast Table." He was wonderfully well and vigorous despite his 84 years, but tired out with visitors, so he made me first of all tell him all about myself, and the great Congress at Chicago. When enquiring after other old Cambridge friends, I reminded him of a "bon mot" of his own, which was literally a "daisy." When he visited Cambridge in '86 to receive his honorary degree, he spent the afternoon with us at Merton Hall, and noticing the daisies scattered over the lawn, he spoke of his admiration of Burns, quoting the address to the "Wee, modest, crimson tippet flow'r." "But one thing," said he, "I have never been able to

understand, why 'crimson tippet'? I suppose Scotch daisies must be different, for I have never yet seen a 'crimson tippet' one. My cousin, a Scotch lassie, at once 'pu'd a gowan fine,' and turning the under side, showed him the crimson tips." "Well, well," said the genial autocrat with a pleasant laugh, "Who would have thought so simple a flower could be so double-faced." But soon his voice was stronger, and then the poet professor rippled on, genial, sympathetic, interesting as ever, greatly to our delight. It was a sermon lesson in itself to hear him talk, and see him enjoying the well-earned repose of life's evening, yet lusty and young in spirit still.

In token of days gone by, when, as my professor, he had stimulated me, as he had others, to work for others as well as one's self, I asked him to accept the dedication of the Congress prize essay and to write a short introduction, as thereby its usefulness would be immeasurably increased. He said that he was simply straightening up old work, and therefore undertaking no new work of any kind, but he would take my request to "avizandum" as the Scotch folks say. A mother's plea has since obtained his kind assent to the son's request. Before leaving, he gave me a kind of birthday book, selections from his poetic and prose writings, for my mother, and an excellent photograph for myself with the cherished autograph, Oliver Wendell Holmes.

As he drove away at the station after a cheery farewell, "The tell-tales of memory wake from their slumbers," his own allusion to that *annus mirabilis*: "The year 1809, which introduced me to atmospheric existence, was the birth-year of Tennyson, Gladstone, Lord Houghton, and Darwin. . . . Persons of the same year watch each other, especially as the sands of life begin to run low." All gone, but one and him. The sad thought was not to be repressed. The sands of life are running low, but in their case, may they run very, very slow.

A day with the Pan-American Medical Congress at the Harvard Medical School, gave me the happy chance of renewing friendship with several former fellow students, now flourishing and famous practitioners and teachers. September is a bad month to seek for old friends in Boston, but my old professor, the President of the Congress, and old fellow dental students like Ailes, Page, and Bouvé, awoke memories of other days, and made me feel my stay was all too short.

In hard-up student days we used to make good use of the great Public Free Library, for it was rich in books we could not buy, so I ran in to look at the old place, and also visited the magnificent new palace of literature, making a mental snap-shot of the magnificent motto engraved on its front, "The Commonwealth requires the Education of the People as the Safeguard of Order and Liberty."

A stay at Longbranch with an old Harvard student, now President of the Dermatological Society, in New York, a visit to Farrar in his country home, instructive hours in the "Studios" of Northrop, Farrar, Perry, and Walker, kindly help in packing up demonstration material I had brought West in vain, and friendly chat with old friend Harmstadt, of the S.S.W., N.Y. House, simply made every moment busy, and happily memorable for a long time to come. A farewell dinner at the Lotus Club, combined by Drs. Walker, Northrop and Perry, brought me once more under the glamour of friend Burne from New South Wales, with whom I embarked next morning on board s.s. *New York*. One felt so much at home amongst familiar faces on the ship, that the sense of parting from the kind faces on the quay was somewhat deadened. Good bye, a waving of "hankies," a tear in the eye, yes, a tear, and all is over. No, one last snap-shot, and it's a good one too, to remind us at home in wintry hours of all that glorious summer time, and the inexhaustible kindness and hospitality of so many American friends.

A happy, pleasant, almost uneventful week, and then the rough and ragged Scillies, then the gray headlands of Cornwall, ruddier those of Devon, at last the familiar white chalk cliffs, and we are landed once more, wiser, healthier, happier for this last professional holiday.

L'ENVOI.

"Waste not your Hour nor in the vain pursuit
Of this and that endeavour and dispute;
Better be jocund with the fruitful grape
Than sadden after none, or bitter, fruit."

OMAR KHAYYAM.

THE BRITISH DENTAL ASSOCIATION.

ANNUAL MEETING, 1894.

THE Annual General Meeting of the Association was held at the College of Medicine, Newcastle-upon-Tyne, on March 29th, 30th, and 31st, and was attended by a large number of members.

The proceedings commenced with a conversazione held on the Wednesday evening in the Natural History Museum, where the guests as they arrived were received by the Local Committee, Messrs. J. Fothergill, Somerville Woodiwiss, R. A. Turnbull, W. G. Routledge, C. F. Sutcliffe and J. T. Jamieson. There were between 300 and 400 present, including many prominent members of the Association, and a large number of leading citizens. An excellent concert was provided. The phonograph was exhibited during the evening, and the North of England Microscopical Society gave an exhibition. Refreshments were served in the Geological room.

THURSDAY.

The Association settled down to its more serious business on Thursday morning, when at 10 o'clock the Representative Board met in the Council Chamber.

THE ANNUAL GENERAL MEETING

Was held at 11.30 in the Lecture Theatre and was largely attended. The Chair was occupied by the retiring President, Mr. W. H. Breward Neale, who was supported by the President-elect, Mr. C. S. Tomes, F.R.S., Professor Philipson (President of the British Medical Association), and Mr. W. B. Paterson, Honorary Secretary.

The PRESIDENT in his Valedictory Address spoke of the progress made by the Association during the year he had filled the position of President. A Microscopical Section had been successfully inaugurated and would, he hoped be, a very successful section. It was gratifying to observe the notice the press had taken of their meeting, and the way their work had been recognised by the public. Then there was the fact that Royalty had been identified in opening a dental hospital. These matters might appear insignificant, but they were satisfactory as showing the position to which the dental profession was rising. With regard to the political side of the question, he would point out that the General Medical Council, in declining to register diplomas of American, or other colleges, which did not come up to their standard of education, had taken what he regarded as a very important step. It was satisfactory to know that they were moving in a distinct line towards a distinct object. Referring to legislation and the Plymouth case, he said, they must remember that legislation in this country was for the protection of the public, and in no way for the protection of a profession. The position of the medical profession in regard to quacks was not so satisfactory as the position of the dental profession. They had a

great deal to be thankful for in the Dental Act. It was stronger than the Medical Act ; and, if properly exercised, they would have the General Medical Council with them. He believed by cultivating the good feeling existing between themselves and the Medical Council, they would be able to do much more to raise the general tone of the profession, than by mere prosecutions. They did not wish to be identified with prosecutions except when absolutely necessary.

Prof. PHILIPSON, as President of the University of Durham College of Medicine, as Chairman of the Board of Faculties of the University of Durham, and on behalf of the medical profession of the North of England, offered to the members of the British Dental Association a very hearty and cordial welcome. He hoped the arrangements made by the authorities of the college for the holding of that great gathering would be suitable.

On the motion of Mr. J. Smith Turner, seconded by Mr. C. S. Tomes, and supported by Mr. S. J. Hutchinson, a hearty vote of thanks was passed to the retiring President.

Mr. C. S. Tomes then took the Chair as President for the ensuing year.

On the motion of Mr. Rhodes, seconded by Mr. Sutcliffe, the Committee of Literary Referees were re-elected :—The Committee comprises the President, Messrs. Cunningham, Harding, Kirby, Matheson, Mummery, Lloyd Williams, and Drs. Walker, Smith, and Slack.

THE TREASURER'S REPORT.

The TREASURER (Mr. W. H. Woodruff) presented his report, which after referring to the considerable expenditure that had been unavoidably incurred during the year, said there was a balance in the bank at the present time of £475 12s. 11d. The total membership was 863, and if the whole of the members paid up their subscriptions the balance in hand would be £1,140 5s. 11d., instead of the sum he had named.

THE HON. SECRETARY'S REPORT.

The HON. SECRETARY (Mr. W. B. Paterson) presented his report, which stated that the Executive feel that they have passed through a year of considerable anxiety. Forces have been at work amongst the members of the Association which, in some degree, have proved embarrassing to the Executive, and have tended to convey an impression that the Executive is either incompetent or unwilling to serve the Association. How far such an impression is justifiable it is not for your Executive to say. Time alone can fitly test their services, and the ballot box will show how far they have forfeited the confidence of the Association. During the year the Representative Board met on seven occasions, and the Business Committee have held eleven meetings. They have been occupied in considering cases of alleged infringement of the Dentists' Act, and

the behaviour of the Irish College in reference to the mechanical apprenticeship portion of the dental curriculum. It states that the Plymouth prosecution was a decided advance in the interpretation of Sect. 3 of the Dentists' Act in our favour, and suggests that other cases may be taken up with advantage, though there will be the chronic difficulty about funds, and also the difficulties of procuring evidence, and the time which is taken up in arranging the cases. The Secretary suggests that it might greatly aid the Association if the members resident in a district, where a prosecution was contemplated, would join with the Association in sharing the expenses. The manner in which the Medical Council have dealt with the Harvard and Michigan Universities in the matter of registration of their dental diplomas seems to have given general satisfaction to the profession at home as well as in America. The Executive have not taken any direct measures to utilise the recent prescript of the Medical Council regarding the practice known as "covering," but they hope to make it subservient to the objects of the Association. Hearing the Royal College of Surgeons in England is seeking to obtain an increase of power over their Fellows and Members, the Board at once made representations as to the Licentiates in Dental Surgery being brought under the same conditions. The suggestion was very favourably received by the authorities of the College who have referred the matter to the consideration of their solicitors, and have promised that if it can be done the request shall be complied with. The Popular Report of the Schools' Investigation Committee which is a concise and clear account in simple language of all the work done by that Committee since its establishment, has not yet been issued, but the Board hope to place it in the hands of the members ere long. During the year the following invitations have been received from important learned bodies. The National Health Congress invited the Association to send delegates to its meeting at Edinburgh, and in response Messrs. Bowman Macleod, Walter Campbell and J. R. Brownlie were appointed and attended. The International Medical Congress, now meeting in Rome, also invited delegates, and five were appointed, but from illness and other unavoidable causes, only one delegate, Mr. J. Howard Mummary, finds himself able to attend, and he does so under great difficulties. The International Congress of Hygiene and Demography, which is to be held in Buda Pesth in September next, now invites delegates from the Association.

Mr. H. BLANDY then entered into a long criticism of the expenditure of the Association, contending that if some influence was not brought to bear upon the spending party, viz., the Representative Board, the Association would soon be bankrupt. There was a net loss on the Journal of £103 arising from the issue of an extra number. The deposit had been decreased from £700 to £400, and he could not tell from the balance sheet for what that £300 was withdrawn.

Mr. W. H. WOODRUFF said the expenditure last year was no doubt exceptional, both for the Journal and the Annual Meeting. No doubt, as Mr. Blandy said, if they went on like that they would

be bankrupt, but they were not doing that. The £300 was withdrawn from deposit to meet liabilities. The Board had limited the expenses of the Annual Meeting to £100 and they would also save the cost of the extra issue of the Journal.

Mr. BLANDY having professed himself satisfied,

Mr. BREWARD NEALE moved the adoption of the Treasurer's Report. This was seconded by Mr. Harding and agreed to.

Mr. BLANDY then moved in accordance with notice "That members of the Representative Board living over fifty miles from the place of its meeting, have their railway fares paid by the Treasurer of the Association." He thought this was a matter of expediency and justice. There were thirty members of the Board, fifteen in London, and fifteen in the Provinces, and in the result the London man was constantly able to out-vote the Provincial man, who might not attend on account of the expense and loss of time. The same difficulty had been found on the Council of the British Medical Association, and it had been recently decided by that Association to pay the railway fare of its members who attended the Council Meeting. He thought the adoption of a similar plan would be of advantage to the Association.

Mr. Fox seconded the motion.

Mr. WOODRUFF said he absolutely failed to find Mr. Blandy's love for economy in this resolution. If they had four Representative Board Meetings in the year the result would be an expenditure of £186 for third class, or £339 for first class fares. The finances would not warrant that expenditure.

Mr. COXON thought that if members did not esteem the honour of being on the Representative Board as far more than an equivalent for their mere travelling expenses, they had better leave the Board.

Mr. F. J. BENNETT thought members of the board would refuse to receive their expenses. The members of the British Medical Council were sent as delegates, but he hoped the day would never come when the members of the Representative Board were sent in that capacity.

After a short discussion the motion was put to the meeting and lost, no one voting in its favour.

On the motion of Mr. BACON, seconded by Mr. READ, the Hon. Secretary's Report was adopted.

The PRESIDENT declared the ballot for the few vacancies on the Representative Board to have resulted in the election of Messrs. H. Blandy, G. Brunton, Lawrence Read, W. H. Coffin, J. Ackery, Breward Neale, W. Hern, H. Bigging Mason, J. C. Storey, and A. A. Matthews.

Mr. BLANDY said he had been put up without his consent. He wrote to the Secretary for Scotland to decline the honour. He did not now know whether he could do much good on the Board.

THE ANNUAL MEETING, 1895.

Mr. W. B. PATERSON said the Board recommended that the invitation of the Scottish Branch to hold its next annual meeting in

Edinburgh be accepted, and that Mr. Bowman Macleod be the President.

On the motion of Mr. COWPER, seconded by Mr. BREWARD NEALE, it was resolved to accept the invitation of the Scottish Branch.

Mr. CAMPBELL proposed and Mr SUTCLIFFE seconded the election of Mr. Macleod as President for that year. The motion was carried by acclamation, and was responded to by Mr. Macleod, who assured the Association that they would receive a very cordial welcome on their visit to Edinburgh.

The question of the date of the meeting was then considered.

Mr. W. H. WOODRUFF proposed that the meeting be held in March. He said the Scottish Branch had made their paper an open one, though expressing a preference for August. He (Mr. Woodruff) thought it was preferable to keep up the continuity of the meetings so that the term of the Presidency should be the same, otherwise, one President would be in office for sixteen months, and the next, perhaps only eight months. He thought March was preferable on many grounds.

Mr. LAWRENCE READ seconded.

Mr. BREWARD NEALE proposed that the meeting be held in August. They would, he thought, be more likely to get a large meeting in August than in March.

Mr. REES PRICE seconded.

Mr. BEADNELL GILL thought that if their Scottish hosts had any preference it should be considered.

Mr. J. SMITH TURNER pointed out that if the Association went in August they might combine business with pleasure, and make it part of their holiday. He believed it would result in a larger meeting.

The matter was then put to the vote and it was decided by a large majority to hold the meeting in August.

In the afternoon the members met in the large Lecture Theatre when the President of the Microscopical Section, Mr. J. Howard Mummery, M.R.C.S., L.D.S., delivered an address, the President of the Association again occupying the chair.

SCIENTIFIC DENTISTRY.

Mr. MUMMERY, who was received with applause, said that at their last annual meeting the experiment was tried of organising a Microscopical Section of the Association, it being felt that the necessarily short time which could be given to scientific matters in the general business of the meeting, during its short session of three days, was not sufficient to do justice to that by no means unimportant part of their work, and that better results could be obtained by holding a sectional meeting. One feature of that sectional gathering was to be an annual discussion in some special department of microscopical histology or pathology. The subject would be decided at the previous annual meeting, and members would thus have time to read up beforehand, and to prepare specimens and lantern slides in illustration of their work. It was also proposed to devote a

portion of the time to a conversational lantern demonstration. Nothing of very great importance had appeared during the last year in connection with dental histology or pathology, and what new researches had appeared, hailed chiefly from abroad. He then touched on the researches and discoveries of Dr. Morgenstein, Mr. Hopewell Smith, Professor Rose, of Freiburg, Professor Miller, of Berlin, and others, and proceeded to say that the establishment of such a section as that in their Association did not, in his opinion, require any defence. There was still, however, a good deal of misunderstanding in this and other countries as to the direct bearings of science and scientific investigation on practical life. If, as was said, they were an eminently practical nation, that was all the more reason why they should be an eminently scientific nation. There was no separation between the two, and they should not be looked upon as antagonistic. Scientific research was the pursuit of accurate knowledge; the daily work of the practical man was founded on scientific knowledge, and when they heard him say that he did not want science and generalities, but something useful and practical, they could not think the more highly of his intelligence or powers of discrimination, for it was the labours of the numberless scientific workers, who had preceded him, that had made his practice possible. Science and practice went hand in hand. Practical results were eminently called for in their profession, and science without practice would be like faith without works. But being so much engaged in the practical application of knowledge, they were the more in danger, perhaps, of forgetting the foundations of their knowledge. Some minds were so constituted that the abstract form of scientific thought was an impossibility to them, but the practical man, who made use of careful observations, and recorded in his mind the deductions from them, who did not work absolutely by rule of thumb, was pursuing scientific methods, and was, so far, a man of science. When, in any of their societies they had a scientific paper read, let them discuss it from the scientific standpoint, and not urge its consideration from the practical side only. The scientific was the foundation, the practical would follow, and with all the better results, because they were not forced, but came rather with the gradual growth of developing knowledge.

On the motion of Mr. STORER BENNETT, London, seconded by Mr. CAMPION, Manchester, a vote of thanks was accorded to Mr. Mummery for his address.

R. P. LENNOX, of Cambridge, read a paper on "Matrices, How to Make Them and How to Apply Them," and afterwards gave a demonstration of his methods. He showed what a properly fitting matrix is like, when removed from the tooth and opened out. By comparing this band with a similar band upon a cone, similarly opened out, he showed that a matrix is practically a portion of a flat ring. He then gave a scientific but simple and thoroughly practical method of obtaining a matrix to fit a given tooth, and again referring to the cone, showed that the ends of a matrix to come together properly must be radii of the circles forming the flat ring, of which it is a part. He introduced a clamp to carry such a matrix

and showed how the matrix is to be inserted and finally adapted to the form of the tooth. Calling attention to the grooves generally to be found running down the sides of teeth, especially of upper bicuspid, he pointed out the uselessness of a wedge to force the lower edge of a matrix into such a groove and explained a method of overcoming the difficulty. This consisted in slipping the matrix, when inserted into the clamp, upon a mandril having grooves in it corresponding to those in teeth, and forcing the lower margin of the matrix into the groove. He finds that the bent portion of the matrix forces itself into the groove in the tooth, when one exists, and is not drawn out on screwing up the clamp. Lastly, he showed how by means of a thin wire loop a matrix may be secured in position for any desired length of time, pointing out that it is often necessary so to secure it in the case of amalgam fillings, and how the patient may himself easily and quickly secure it after the appointed interval.

Mr. T. E. CONSTANT, of Scarborough, read a paper on the "Dentists' Register of 1893," in the course of which he urged the desirability of the direct representation of the profession upon the General Medical Council, and touched on the question of the possible influx into the dental profession of those who were failures as medical men. He also urged the necessity for establishing a higher dental degree.

Mr. W. B. PATERSON, the Hon. Secretary, explained the steps that had been taken by the Business Committee with regard to obtaining representation on the Medical Council, but was unable to hold out the hope of any practical result at present.

A Casual Communication, supplied by Mr. G. Brunton, of Leeds, was read. It referred to "carborundum," a substance which it was proposed to introduce into dental mechanics as a substitute for corundum. Carborundum is so excessively hard that a micro-slide was exhibited showing a diamond that had been roughened by carborundum wheels.

RECEPTION BY THE PRESIDENT.

In the evening the President gave a reception in the new Assembly Rooms. A large number of ladies and gentlemen accepted invitations. The guests were received by the President and Mrs. Tomes. In the course of the evening

PRESIDENT'S ADDRESS.

The PRESIDENT delivered his address, in which he cordially welcomed his guests and explained how it was the Association had come to meet in Newcastle. In the absence of any invitation for the annual meeting, it was felt that new grounds should be sought. Having visited in turn the districts occupied by most of the branches, they naturally turned to some place comparatively remote from the head-quarters of any of them, and Newcastle was no sooner thought

of than selected, both on account of its interest and importance and of the dental profession being well represented there. He had learnt with unfeigned regret that in the discussion as to the place of meeting, an expression was used which had not been palatable to their friends in the North. He did not know who it was that first said that the Association should break new ground on a missionary quest, but the expression "caught on," and was repeated with the unhappy result that some interpreted it as meaning that they proposed to go where heathens sat in outer darkness. He was sure no such meaning was in their minds. The idea was merely to knit closer the bonds uniting them as members of one calling, and possibly gain a few new adherents. That they had been forgiven was sufficiently attested by the kind hospitality they had received. He then proceed to review the conditions of a dentist's life, of that which conduced to his success or failure, and of the manner these conditions react upon the man himself. As a united body, their profession was very young, and it possessed the faults of youth. They were apt to expect too much, to hope to go too fast, and to clamour for a degree of consideration which could only be accorded in the fulness of time, if ever. This consideration might take the form of more social recognition, of a higher scientific status, or more power to work out their own ideals, but, whatever form it took, it could, in the very nature of things, only be of slow growth, and by clamouring for it before it was accorded they ran the risk of being snubbed for their pains. Passing on to consider the condition called for to make the successful practitioner, he pointed out the danger, lest, led away by the pride of manipulative dexterity, they should underrate directions of study, which, to the thoughtless, seemed to have little practical outcome. The scientific habit of mind by which to observe correctly and draw conclusions legitimately was essential, but it was fortunately one which could be cultivated. It must not, however, be allowed to at all take the place of the patient acquisition of manipulative, and he might say empirical skill. But with all this, success was not fully assured. The young aspirant must have a certain steadiness of nerve, which would enable him in the face of his special difficulties to be fully master of all the skill which he possessed, and this would go far towards securing the confidence of his patients. He must be painstaking, for it is in attention to minutiae that, just as in modern surgery, the difference between success and failure lies. He must have tact, and a quick judgment of the idiosyncrasies of his patient, which he must be both quick to appreciate, and, within proper limits, adapt himself to meet. He must have a good physique. His work was hour after hour exhausting in a degree that no one, who had not tried it, could appreciate. With busy practice came another difficulty, *viz.*, to avoid being hurried, and to keep for each patient time enough to do him justice. It was unfortunately the case, that in all branches of the medical profession, the ear of the public was sometimes to be caught by self-assertion and the many hydra-headed forms of quackery. It was sometimes asked why, when the manufacturer or the dealer advertised his goods without

exciting the smallest adverse comment, should it be considered discreditable for a barrister, a stock-broker, or a medical man to advertise himself? The difference was not far to seek, though often overlooked. The one extolled a thing, the other extolled a man—himself. And there was a further difference. The thing might be new, and all that is said of it true, but this could hardly be the case with the personal advertisement. All knowledge that is of importance, in a professional sense, was very soon public property, for each to make use of, as his abilities serve, but it would hardly have the effect he desired were the advertiser to say, "I am even as other men are." He must brag in some form or it would be no good, and when he bragged he could hardly be truthful, and must profess more than he could accomplish. Hence, in theirs, as in every other profession, the man who advertised himself was ostracised by his professional brethren. After pointing out how limited the experience of the busy dentist of subjects outside his own profession was apt to be, he continued—"There are countless problems lying before us—the etiology of the diseases we have to treat; problems of heredity laid out before us, a rich and varied field for observation; yet how many cultivate it? even making due allowance for the fatigues of our routine work. By all means let the dentist, who would keep his mind fresh, cultivate a hobby. A hobby is more restful than idleness, and is a joy for ever, if it be well chosen. Important to the well-being of the individual as are his teeth, yet man is not wholly a complex organism constructed for the purpose of carrying about thirty-two, or fewer, teeth. Useful as I hope we are, we are only a small section of a great community; and while we hope that any legislation, which we may be able at any future time to influence, will be upon the lines on which we have hitherto sought to improve the position of our profession, we must always remember that it is only because the advancement of our profession is, broadly speaking, for the public weal, that what has been affected in the past was possible. And we may be sure that that which may be effected in the future can come into the sphere of possibility only upon the same grounds of general public utility."

On the motion of Mr. C. F. Sutcliffe, seconded by Mr. W. G. Routledge, a vote of thanks was accorded to the President for his address.

FRIDAY.—THE BENEVOLENT FUND.

The first business on Friday was the Annual Meeting of the subscribers and friends of the Dental Benevolent Fund, Alderman Lee Rymer, presided. The Treasurer, Mr. A. J. Woodhouse, in his report said it was only by comparing their financial position with that of former years that they could judge of the progress of the Fund. At the last annual meeting, in consequence of the change of the date, there was an account of only six months to give. To get a correct comparison he must therefore go back to the report of 1892. The total receipts for that period were nearly £20 greater than those of last year, but on examination they found that

the fact was due to an unusual amount of donations, which in 1892 amounted to £144 16s. 3d. as compared with £70 9s. 11d. last year. They must, however, congratulate themselves on the fact that under the head of subscriptions they had a decided increase, the amount last year being £306 5s. They had at present invested £1,414 14s. 6d. He was, of course, anxious to see their investments increase, but he thought it very desirable to assist urgent cases, as they arose, rather than to put money away for the unknown future. The benevolent allowance had again decreased last year, the amount being £316 15s. 10., as against £353 2s. 4d. in the previous year. The committee had been very cautious in their distribution of the funds, and had allowed no case, which was worthy of help, to go unaided. Had their means been better assured, the committee would have given more substantial aid in some cases.

The SECRETARY (Mr. J. Ackery) in his report, stated that fourteen old cases were receiving pecuniary help from the Fund. Since the last annual meeting seven new cases had come before the committee, and every case had been thoroughly investigated. In many cases the committee would have given increased aid had they had a larger income. The Rules had been thoroughly considered by the committee and on the whole were thought satisfactory. Certain alterations would be proposed. A new trustee had been appointed, and the vacancies on the committee filled up subject to the approval of the subscribers.

On motion from the Chair, seconded by Mr. WAITE, the Reports were adopted.

The appointment of Mr. Lee Rymer as trustee in the place of Mr. James Parkinson, and the election of Messrs. Dennant, Maggs and Mr. Woodruff on the committee were confirmed. Mr. Mummery and Mr. Gibbings were also re-elected.

Mr. Ackery was re-appointed as honorary secretary, and Mr. Woodhouse as treasurer, and votes of thanks were passed to the officers for their kind services during the past year.

GENERAL MEETING.

At the adjourned general meeting on Friday, considerable time was spent in the discussion of the report of cases of alleged infringement of the Dentists' Act drawn up in accordance with a resolution passed at Birmingham last year.

The report which extended over the period from August, 1892, to March, 1894, showed that forty-six complaints had been received and considered, of these twenty-nine came from members, and seventeen from other persons. In some of these warning letters had been sent in, and in other legal proceedings were taken.

Mr. H. BLANDY said that it was hardly fair that the Association should be called upon to undertake the prosecution of cases at the instance of persons outside the profession, unless they were willing to provide a portion of the expense. In such cases the hat should be sent round locally amongst those who would benefit by such

actions. He asked how many prosecutions had been successful in the sixteen years since the passing of the Act.

Mr. W. B. PATERSON said there had been about fourteen or fifteen successful cases tried in Court since the establishment of the Association.

The PRESIDENT said the report was marked "Private and Confidential," and asked whether it was desirable that it should be published.

Mr. CAMPBELL thought there would not be much to be gained by making it public. He moved that it be kept private.

Mr. DAVID HEPBURN seconded.

Mr. LEE RYMER agreed that the report should be private, but he demurred to the idea that no notice should be taken of complaints except from members of the profession. Their work was to be done in the interests of the public, and complaints from the public must be considered.

Mr. BLANDY agreed in that, but his point was that complaints from members of the profession, who were not members of the Association, should not be received unless they contributed to the funds.

Mr. J. SMITH TURNER was quite sure the Business Committee would consider any complaint that come before it, no matter from what source.

Mr. WOODRUFF in supporting Mr. Rymer's remark, pointed out that the Association was formed really for seeing that the Dental Act was properly carried out, and not for looking after their own individual interests. He thought, therefore, all complaints should be received by the Business Committee, and it should be left to their discretion to deal with them.

Mr. S. J. HUTCHINSON wished it to go forth as the expression of that meeting that these prosecutions were undertaken for the protection of the public, and not for the benefit of the dentists themselves.

The Report was then adopted, and an amendment moved by Mr. J. S. TURNER and seconded by Mr. GILL, "That the Report should be published in substance but not in detail," was carried by 25 to 13.

Mr. W. CAMPBELL (Dundee), moved "That a Dental Defence Fund be established in connection with the British Dental Association for the purpose of defraying expenses in actions at law." He said last year a good deal of dissatisfaction was expressed as to the Board not prosecuting certain flagrant cases. Recent events had shown the wisdom of their caution. It was admitted by all that the sinews of war must be raised over and above the annual guinea subscription. Some thought that members residing in a locality where prosecutions were undertaken, should contribute towards the legal expenses. He personally would not subscribe a single penny for any such work done in his district, but he would subscribe half-a-guinea, or even a guinea if need be, for such a purpose as that stated in the motion. He pointed out that the successful prosecution at Plymouth, gained on Clause III. of the Act,

had ripened quite a harvest of cases quite as flagrant, but their prosecution meant money, which could not be taken out of the funds of the Association. Judging from the number of unregistered men practising dentistry in his own locality, the total number in the United Kingdom must be very considerable, and as the feeling prevailed that legitimate practitioners as well as the public should be protected, such fund as here advocated was the legitimate way of protecting the interests of both. The framers of the Dentists' Act having seen the working of the Medical Act, and detected its weak points, had introduced in Clause III. a sentence, which, if not so clear and strong as some would have liked, was so clear that most judges need have little difficulty in giving judgment. Medical practitioners felt greatly the want of such a sentence in their Act. It provided: "A person shall not be entitled to take or use the name or title of 'Dentist' (either alone or in combination with any other word or words), or of Dental Practitioner, or any name, title, addition, or description implying that he is registered under this Act, or that he is a person specially qualified to practice dentistry, unless he is registered under this Act." Other points which might legitimately be embraced within the working of the Fund, and at some future time they might be strong enough to work on the same comprehensive lines as the Medical Defence Union.

Mr. MECHAN seconded the motion.

Mr. BALKWILL said, when the Dental Act was first mooted they were told that its object was not to prevent men practising but that the public should be able to know who was an educated man and who was not. He found on talking to younger men, who had their L.D.S., that that idea was the last that entered into their head; they wanted to stop outsiders practising. The question arose as to how far this was practicable. He thought the system of taking mechanical pupils was to a great extent the reason of the evil complained of, for these men after serving their apprenticeship must earn a living in some way. The public did not suppose that a man who started a Dentorium was a regularly qualified practitioner.

Mr. BOWMAN MACLEOD thought Mr. Balkwill was somewhat under a misapprehension, and that the public did consider that the man who started a Dentorium had received not only the ordinary education of the L.D.S., but something superior.

Mr. BLANDY supported Mr. Campbell's motion. Many members had left the Association because they thought it had not done work enough. He referred to one or two gentlemen who had offered to contribute largely to such a fund if it were established.

Mr. W. H. WOODRUFF said he was not aware of any bye-law prohibiting the Treasurer of the Association taking any of these large subscriptions, that had been promised *sub rosa*. He asked, supposing this fund was established, who was to collect it, and whether it was to be administered by the ordinary Executive of the Association.

Mr. CAMPBELL thought the Business Committee would manage the matter, with the addition of perhaps three or four others selected from the Association.

Mr. BEADNELL GILL said, with regard to the law of covering, the Association would be in a very delicate position in a great many cases, where prosecuting when making use of funds expressly subscribed for that particular object. That law was at present in even a still more delicate condition than the law of libel, and he should himself think very seriously before subscribing to a distinct Defence Fund. He had no objection to increasing his subscription to the general purposes of the Association, but to form a separate and distinct Defence Fund or Prosecution Fund as it would really be, would be rather dangerous.

Mr. F. J. BENNETT agreed with Mr. Gill, in thinking that the provision of a fund for prosecuting them was a matter to be deprecated. They had already the means of prosecuting where necessary and any increase in that would be going on wrong lines. The time would come when dental practitioners would become less and less in number, and their best course would be to endeavour to raise the tone of the profession.

Mr. J. S. TURNER said hitherto the Board had been able to consider dispassionately every case brought before it, and as yet no appeal for funds had been made. If members of the Association would only pay their subscriptions, the Board would be able to go on with any prosecutions they might wish to enter into.

The motion was then put and lost by a large majority.

It was resolved on the motion of Mr. Bowman Macleod, seconded by Mr. Somerville Woodiwis that the publication of the Transactions in a separate form be suspended.

TEETH OF SCHOOL CHILDREN.

The Fourth Report of the Committee appointed to conduct the collective investigation as to the condition of the teeth of school children, was then received and adopted.

This report stated that about thirty case-books have been issued since the last tabulation, but only two books, containing 200 examinations, have been returned. The statistics derived from the 2,000 cases recorded in the new case books have done more to prove the very early origin of decay in certain teeth, the very rapid progress of that decay, and the inevitable fate of such teeth, and their effect on the whole denture, unless treated in an early stage of decay, than 8 000 odd cases recorded in the old case-books. The appeal for financial help for this purpose to those who have sympathy with the objects of the Collective Investigation, but are unable to devote time to the conduct of examinations, has met with no response outside of the Committee. They are deeply grateful to one of the largest contributors to their statistics in last report, Mr. Percy L. Webster, for his valuable help in the uninteresting labour of copying a considerable part of the old case-books, and to Mr. Mosley for his careful and prompt returns.

The general results of this examination of the teeth of 200 waif children are shown in Table A.

TABLE A.

Showing the General Results of an Examination of 200 Waif Female Children in Nazareth House School.

Age.	No. Examined.	Sound Dentitions.			Defective Permanent Dentitions.				No. of Carious Teeth.		
		Temporary.	Transitional.	Permanent.	I.-IV.	V.-VIII.	IX.-XII.	Over XII.	Temporary.	Permanent.	Total.
5	12	1	1	...	...	...	...	...	68	...	68
6	11	1	1	...	3	...	...	...	23	6	29
7	19	...	1	...	6	...	...	...	43	15	58
8	24	...	4	...	10	...	...	...	34	22	56
9	25	...	5	...	13	...	...	...	28	34	62
10	31	...	11	1	9	...	1	...	22	30	52
11	22	...	1	1	10	3	...	...	19	46	65
12	30	...	1	1	12	5	1	...	24	73	97
13	14	...	...	3	3	6	1	...	2	55	57
14 & 15	7	...	...	...	3	2	...	1	1	41	42
17 & over	3	...	...	...	2	...	1	...	...	17	17
Total ...	198	2	25	6	71	16	4	1	264	339	603

Two exceptional cases—one at twenty years with twenty-eight defective permanent teeth (fourteen carious but savable, eight unsavable, and six already extracted); and one "patient born without arms," aged thirty-nine, entirely abnormal—practically no teeth at all; feeble intellect.

TABLE B.

Showing the Relative Ratio per 100 Children having Sound, Defective Temporary, and Defective Permanent Teeth (classified quaternarily), arranged Triennial Age Groups. (Nazareth School.)

Age Group.	V.-VI.	VII-IX.	X-XII.	XIII-XV.	XVII.	Quality.
No. Examined.	23	68	83	21	3	198
Sound (no decay)	16	14.7	19.2	14.3	...	Good.
Defective Temporary (Teeth only)	70	42.6	31.3	9.5	...	...
Defective Permanent						
1 to 4 Teeth	14	42.6	37.3	28.5	66.6	Fair.
5 to 8 ,, .....	...	...	9.6	38.1	...	Bad.
9 or more,, .....	...	...	2.4	9.5	33.3	Very bad.

The returns as to the state of teeth have been tabulated, and show that, while 20 per cent. of the children had *clean* and 37 per cent *fairly clean* teeth, 43 per cent. were scheduled as being dirty, foul, or stained. The necessity for an adequate supply of tooth brushes, and for the early cultivation of their habitual use after the last meal, is evident. The number of cases of honey-combed teeth amounted to 13 per cent.—a high percentage. There was only one case of syphilitic teeth.

Appointments have been made at the London Central District School, the Kensington and Chelsea, Edmonton, and Hackney District Schools, as a direct outcome of this part of the Association's work, and the Metropolitan Asylum Board have re-appointed the dental officer to the training ship "Exmouth." The committee hope for the co-operation of the holders of these appointments.

The published results attracted the attention of dentists in other countries, notably in Sweden, Switzerland, France, and the United States, whence enquiries have been received as to the methods of conducting it. In Sweden a small grant from the Government has been promised to a special committee of the Stockholm Dental Society. This society has determined to conduct the examinations on identically the same plan adopted in this country.

Such recognition should encourage the Representative Board to favourably entertain the proposal of the committee that the Local Government Board should be approached on the question of the appointment of dentists to the schools under its authority.

From motives of ill-judged economy guardians have hesitated, and still hesitate, to adopt the only means which would stay the increasing spread of decay of the teeth. It is the duty of the medical profession to use their influence at once to render the public cognisant of the danger which menaces them in the persons of their children.

The Committee regret the resignation of Mr. Leonard Matheson, who has acted as Secretary to the Committee since its formation.

MICROSCOPICAL SECTION.

On Friday morning a meeting of this section was held in the Lecture Theatre, Mr. C. S. Tomes, President, being in the Chair, at which Mr. A. W. Baker, of Dublin, read a paper on "Treatment of Pulp with Sublimate," with experiments on calf pulps.

GENERAL SECTION.

On resuming after luncheon, a discussion on "Methods of Training Dental Students in Mechanical Dentistry" was initiated by a paper on the subject by Mr. Cunningham, of Cambridge (who was not present, having gone to attend the Medical Congress at Rome), which was read by the Hon. Secretary, and in which Mr. Cunningham advocated the establishment of an Institute of Dental Technology as opposed to private pupilage and the apprenticeship system. Such an Institute would, he said, be formed

for the purpose of giving instruction in dentistry and manual training in those branches of art and science which had a bearing on the process of dental mechanics. Such an Institute, too, would provide a more thorough system of practical education than was possible in the laboratory of the private practitioner, with classes where students should receive practical training for three years, as required for a license in dental surgery by the College of Surgeons, and also classes for those who desired a similar training, but in a more extended course, in order to enable them to act efficiently as dental mechanics under qualified dental practitioners. Facilities would also be provided for qualified practitioners, who desired opportunities for original research. In conclusion, Mr. Cunningham exhibited specimens of dental mechanics produced by pupils of from three weeks to three months' training.

Mr. A. J. WATTS said that during the past few years there had been a growing conviction in the minds of many members of the dental profession that the mechanical training of students was extremely inefficient, and it was necessary that steps should be taken at once to insure pupils obtaining the thorough practical tuition they were supposed to receive. He considered that there was room for great improvement with regard to the method of teaching students. He thought a dental hospital was the proper place for an ideal mechanical training school, and, subject to certain conditions being fulfilled, there was no reason why such an institution should not be a success. One argument against mechanical training schools was the increased expense to which parents or guardians living in the provinces would be subjected. Under those circumstances it would be better to article the pupil in the ordinary way to some dentist who made mechanical work a speciality. In conclusion, he laid great stress on the necessity of the authorities instituting an examination in dental mechanics before the student entered on his curriculum.

Mr. NEWLAND-PEDLEY, of Guy's Hospital, strongly opposed the institution of a School of Dental Technicology. In the hands of Mr. Cunningham, or some of the most distinguished members of the profession, there could be no fear that the school would be well managed, but other institutions might be established, and men would band themselves together to advertise institutes, and therefore do injury to the profession. He quite agreed that the student should be made to pass an examination in practical dental mechanics before entering the hospital.

Mr. BOWMAN McLEOD, Dean of the Edinburgh Dental School, also agreed as to the desirability of students being subjected to a mechanical examination before entering the hospital. It was necessary that the student should learn the rule of thumb-work first, and when he had done that and acquired some dexterity in the handling of his tools, he should be taught the theory of the principal underlying the subject. The work of the dental school should partake more of the nature of applied dentistry. The proper place for a young man who had been educated up to 17 or 18, was either a private pupilage in a good class practice, or attendance at the

Dental Hospital, and that was also the place at which the higher grades of mechanical dentistry and applied dentistry should be taught.

Dr. A. W. BAKER (of Dublin) said that the mechanical department in the Dublin Hospital had been found very useful and worked well. A small fee was charged for mechanical appliances, and there were a very large number of applicants.

Mr. J. A. BIGGS said there could be no doubt that the proper institute for the training of students was a dental hospital, for there only would they have the guarantee that men would be under the guidanceship of those who had ability to teach. At present pupils fell into the hands of practitioners incompetent to teach, and they themselves turned out even more incompetent men. He thought that after the man had passed his preliminary, he should at once be sent to the mechanical department for two years.

Mr. BEADNELL GILL thought all would confess that the system of apprenticeship had more or less failed, but he was not quite convinced that its abolition would be entirely for the future welfare of the profession. A man who had had originally a good mechanical training himself, would of necessity be better able to influence one or two youths under him, than they would be by only receiving such partial attention as could be obtained in a hospital. He believed the foundation of improving the mechanical training would be in an extremely rigid examination. Anyone who had had any connection with London Hospitals would know that a mechanical department at a hospital was open to serious abuse.

Mr. S. A. T. COXON (Wisbech), thought that before a hospital allowed a man to enter he should show his proficiency in an examination in mechanical dentistry as well as in arts. What they wanted was to turn out a level standard of men capable in every branch of the profession, and before leaving the hospital they should show the ability necessary to make them good dentists.

Mr. J. A. FOTHERGILL (Darlington) agreed with many of the other speakers that the Institution of a stringent examination in mechanical dentistry would do away with many of the difficulties which now presented themselves.

Mr. SOMERVILLE WOODIWS said he was strongly in favour of giving pupils a thorough training in mechanics, but he did not think it possible that even clever boys could learn the essentials of mechanical dentistry in a less period than three years.

Mr. J. F. COLYER was of opinion that at any rate in the majority of cases it was much better to let students be taught at the hospitals. The fact that the hospitals were able to turn out fairly good operators in such a short space of time was due to the thorough training that they received before being allowed to undertake operations and also to the complete supervision given during that period. By taking a student for two years on a mechanical apprenticeship, teaching him on the same lines as he was taught in operative work, that was to say, making him go through the process out of the mouth, and then teaching him in the mouth, they could in a hospital make a fairly efficient mechanical dentist in two years.

Dr. STACK (Dublin), was of opinion that the earlier a lad was instructed in the principles of general mechanics the better it would be for himself, and the more successful would he turn out in his profession afterwards.

Mr. S. J. HUTCHINSON asked Mr. Colyer whether he meant that the two years that he recommended to be spent in a hospital were to be spent concurrently, or antecedently, or after the other two years, to be occupied in learning additional surgery.

Mr. COLYER thought that there should be two years spent straight away at mechanical dentistry and two years at ordinary work.

Mr. HUTCHINSON said it was impossible that any dental student could be properly taught dental mechanics in two years if he had to do his dental surgery as well, but if it was admitted that he was going to spend two years entirely in the dental laboratory where there were private teachers and appliances Mr. Colyer's theory was no doubt the right one. The question, however, had to be viewed not from the imperial but from a domestic point of view, and it was quite likely, given the promise that a man has a good teacher that the youth would have a good chance of learning first rate mechanical dentistry by the ordinary three years' apprenticeship. He might be rather old-fashioned in his views, but he thought the older the man was before he entered on his hospital career the better it would be for him. He had of course a great interest in the hospital aspect of the question, and provided they could depend upon a student giving two whole years without any interference to general hospital work he was willing to admit with Mr. Colyer that he would in that time learn a very great deal.

The PRESIDENT suggested that although there was no motion before the meeting it would be interesting to take an informal vote so as to ascertain the opinions of the members.

Mr. ACKERY said he would move "That it is desirable that an examination should be introduced in mechanical dentistry prior to the time at which the men enter the hospital for their surgical training."

Mr. WATTS seconded the resolution which was unanimously agreed to, and an informal vote was then taken on the general question of apprenticeship versus hospital training, and showed that a large majority of those present still adhered to the former system.

THE ANNUAL DINNER.

The Annual Dinner took place on Friday evening, in the new Assembly Rooms. The President (Mr. C. S. Tomes) was in the Chair, and was supported by the Mayor of Newcastle (Alderman S. Quin), the Mayor of Croydon (Alderman Lee Rymer), Mr. Beaumont Macleod (President-elect), the Sheriff of Newcastle, Professor Philipson, Dr. Page, Dr. Drummond, Dr. Williamson, Dr. Vesham, Dr. Arnison, Professor Bedson, Dr. Murphy Dr. Gibson, etc., etc.

After the loyal toasts,

The PRESIDENT gave the toast of the evening "The British Dental Association," with which he coupled the name of Mr. J. Smith Turner. In doing so he said, in proposing the health of such a body the only thing the proposer could do was to explain why such a body should exist. There were the personal advantages of an association which brought them into contact with a number of people they would not otherwise meet. There were also professional advantages, union giving them a degree of influence that they could not otherwise attain. They numbered more than 800 members. Amongst such a body there must at all times be difference of opinion. It was not desirable that they should all think alike, but if they did not meet together in a friendly way, these differences of opinion might develop into something more, *viz.*, differences in action, which would be very much to be deplored. A man might hold an opinion on a certain subject differing from that of others: he might regard his opinion as of first-rate importance, and he had a right to stick to it. But there were differences on points which were not vital, and in such a case they should meet together and endeavour to come to some common and amicable agreement, and go in speaking, generally for what was comprised under the term of good-fellowship. In that, like other associations, there had no doubt been differences of opinion, and a certain amount of friction, some actually withdrawing because the action of the general body were not precisely all they liked. But at that meeting, he himself, and what was of more importance, others had noticed that some of their differences had become smoothed over, and the difference was now quite a thing of the past.

The toast was duly honoured.

Mr. J. SMITH TURNER in responding, said, that night he realised an idea that had possessed him for many years, namely: that their President should be Mr. Tomes. He had long felt that the Association would be better and stronger for being able to number him amongst its Presidents. Their President, in his address, reminded them that they were a young association. It might therefore be assumed that they possessed some of the vices of youth, and perhaps impetuosity had been one of them. They might, however, be excused in feeling proud of being the custodians of the Dentists' Act. They might also be accused, probably the pride of possession, and like young people, they liked to tell what they had, what they were going to do, and what they had done. They had an Association on the same lines as the Association, which was so largely supported by the Medical Profession; they had a Representative Board and a Business Committee. They had also a Journal, and a Benevolent Fund. Amongst their numerous Committees, they had one which tended very much to the weal of the general public, a School Committee. The Association met annually in different parts of the country, and this year they had invited themselves to Newcastle. If they had submitted to the wishes of certain people they would have stayed away, but he must intimate to those people, with all kindness, that neither Newcastle nor Carlisle, nor the districts round about,

belonged to those gentlemen specially, but they belonged as well to the British Dental Association. They had come to Newcastle, and had met with an admirable reception from their dental friends, and every one who had come would be sorry, with the knowledge he now possessed, if he had not come. Since the Dental Act was passed, and the Dental Association formed, the dentists had been welded together in a body, and they had thus felt the power of united action. If they looked back to fifteen or sixteen years ago they would find that in those days a dental hospital was a rarity. There were one or two in London, and a ghost of a one in Edinburgh. Now they had dental hospitals all over the country, recognised by the public and supported, more or less, by the public—though, perhaps, not so generously as they ought to be—and by the medical professions. These hospitals were not merely teaching places, but purely beneficent, serving the public in a way it was never served before. This was one of the offsprings of their Association, and it was a result upon which they might congratulate themselves and feel proud of. The more experience they gained of dental hospitals the more they saw the necessity of keeping them apart from general hospitals. He wished to impress upon their medical friends that in trying to give dentistry a position amongst the liberal professions, they were not doing so in any way approaching false pretences. They wished to do it entirely by education. The Act of Parliament had enabled the public, if it chose to make use of its common sense, to differentiate between the educated dentist and the charlatan; but their object was to place themselves in the ranks of the educated professions by virtue of their education and not by virtue of any Act of Parliament. Under the auspices of the Medical Council, they started from the same platform as all medical schools, *viz.*: the preliminary examination in arts, and if the exigencies of their profession compelled them to differentiate, in the course of their hospital studies, from the medical profession, it was because they wished to prepare themselves for other service.

Mr. S. J. HUTCHINSON proposed the toast of "The University of Durham and Newcastle College of Medicine and the Newcastle Royal Infirmary." In doing so he contrasted the position of Durham and London, and expressed the hope that the day was not far distant when London would have a University for London. He coupled with the toast the name of Dr. Philipson, President of the British Medical Association and also President of the Council of the University of Durham College of Medicine.

Prof. PHILIPSON responded. He said they received it as a distinct indication of the importance of this city that the Association should have visited Newcastle. They were pleased to hear that the Association was following in the footsteps of the British Medical Association. The medical profession could not but express their approval of that. He could only hope that the visit of the Association would be both pleasureable and profitable, and that it would be to its members a remembrance in future years. Reference had been made in very pleasant terms to the esteemed Hon. Secretary, Mr. Paterson. In August last year Mr. Paterson was in Newcastle,

and he then approached the authorities of the College of Medicine respecting that contemplated meeting. On behalf of the authorities of the College he had to say that when the application was made it received the greatest approval. He hoped that the arrangements which had been made by the authorities of the College had been convenient, suitable, and such as would aid in every way in bringing about the success of that meeting. Referring to Durham University, Dr. PHILIPSON said it ranked third in the country, coming after those of Oxford and Cambridge. The University of Durham was advancing in every faculty. In the faculty of medicine they had seen what the College was endeavouring to bring about. With regard to dental surgery they had every desire to aid the dental profession. They had had indications during that meeting that it would be the desire of the dental profession that the College should develop its arrangements respecting the education of the dental surgeon. He felt sure, from what he knew of the desire of the Warden, and the Senate of the University to rise to every occasion which presented itself, that they would be prepared to rise to every occasion which affected the higher education of the North of England. It had that day been intimated to him that they might still further aid the profession of dental surgeons by making certain additions to the education they already gave in that College of Medicine.

Mr. BREWARD NEALE, ex-president, gave "The Mayor and Corporation of Newcastle," remarking that the Mayor and Corporation were to be congratulated on the fact that that great city, although a seaport, had a death rate of only 21 per 1,000.

The MAYOR, in responding, expressed his great regret that pressing public engagements had made it impossible for him to entertain the Association in the way he should have wished. However, he was glad that the local committee had entertained the members in a way which thoroughly became northern hospitality. He most cordially welcomed them to Newcastle.

The SHERIFF also responded.

Mr. S. LEE RYMER proposed "The Benevolent Fund." He said the Fund had done and was doing a great deal of good in keeping above water the heads of some of their professional brethren, also in the maintenance of widows and orphans. He spoke in high terms of the exertions during the past year of their Hon. Secretary, Mr. Ackery, who by personal influence had been able to secure the co-operation of sixty new subscribers.

Mr. J. ACKERY in responding, said the annual subscriptions were at present about £250. He hoped to see them largely increased. He also appealed to the branches to keep up their collections on festive occasions.

Mr. A. R. TURNBULL proposed "The Guests," to which Professor OLIVER responded.

Mr. J. A. FOTHERGILL in proposing the health of the President said, Mr. Tomes had inherited a name illustrious in the annals of dental surgery. He won his spurs in original research at a very early age, and was made a F.R.S. some twenty years ago. He had thrown himself heart and soul into the work of organising and raising the

status of the dental profession, and in doing this had earned the reward which all right thinking men valued, the goodwill and affection of his brother practitioners.

The PRESIDENT briefly responded, and said that if in the conduct of the proceedings he had happened to tread upon any gentleman's toes it was simply with a desire to get through the business and not from any want of sympathy with the speaker.

The concluding business meeting was held on Saturday morning, when votes of thanks were passed to the President and Council of the University of Durham College of Medicine; to the Mayor of Tynemouth, the members of the Local Reception Committee, and others, for the part they had taken in entertaining the association.

In the afternoon a larger party visited South Shields where they were entertained to luncheon by Mr. C. F. Sutcliffe. They afterwards crossed to Tynemouth where they witnessed a display of rocket drill by the Life Brigade.

THE DEMONSTRATIONS.

Mr. STORER BENNETT, F.R.C.S., L.D.S., showed five pieces of apparatus, and their constituent working parts, designed to assist in the retention of artificial dentures.

No. 1. An *automatic* band which, by means of a small spiral spring pressing on the shoulder of a hinged band, allows it to open and close as it passes over the broad portion of a tooth to its narrow neck, when the plate is pushed into its place. By slightly dragging on the plate, the band is made to open when it is desired to remove it again from the mouth.

No. 2. A *locking* hinged band, which can be opened or closed at will, and in either position is retained by a flat spring. This in many instances allows a plate—with the band open—to be pushed into position from the lingual surface of the teeth and the band then closed, instead of the plate being pushed from the masticating surface towards the gum. It is of great service in cases of overhanging teeth, especially when a dove-tailed space with the base towards the gum makes the fit of a plate under ordinary circumstances very difficult, but with this method of adjusting it becomes very easy and very secure.

No. 3. A flat tooth, the backing of which is attached to the plate by means of a horizontally working spring brooch joint enabling the tooth to be raised from the gum line into a position at right angles with its natural position. By this means a lower front tooth may be safely worn on a very small plate, provided the space between the natural teeth is broader at the gum line than at the cutting edge.

No. 4. A tooth for a similar situation, but which is retained in position by a small blade pressing outwards—by means of a spiral spring—against one of the neighbouring natural teeth.

[These preceeding methods were fully described, and their mechanism illustrated in a paper read by Mr. Storer Bennett at the Odontological Society, in November, 1893, reported in the *Dental Record* in January of last year.]

No. 5. An arrangement consisting essentially of a bracelet snap, the box of which is soldered to a small gold plate, and the catch to the backing of a flat tooth. This enables the tooth to be drawn out for insertion or removal, and when pushed back into position, is firmly retained there by means of the snap. It is useful for upper teeth where the hinge would interfere with the bite, and is a simple apparatus which has not previously been shown.

Mr. W. R. HUMBY, L.D.S., demonstrated "Combination Fillings," and explained the advantages of these. No single material possesses all the essential properties of an ideal filling, and Mr. Humby thinks that, by a proper combination of more than one substance, we may so constitute our fillings that only the strong points of each may be utilised, and a more perfect filling produced than is the case when simply using one substance.

In the method pursued the cavity is first lined with a layer of Harvard Cement, care being taken that the dentine is clean, so that the oxyphosphate may adhere firmly. This soft oxyphosphate is then covered with amalgam (submarine being used at the demonstration), the margins of the cavity being freed from any surplus cement. In approximal cavities the matrix is then applied, and amalgam packed to such a level as will leave sufficient hold for the requisite gold.

The amount of the latter should be in strict accordance with the demands for a good appearance for the finished plug. The union between the gold and amalgam may be brought about by inserting a point into the amalgam, at one of the sides next to the tooth-wall or matrix, this point being with gold by holding a cylinder steady with one instrument and packing with another, fresh cylinders being added until the mercury ceases to whiten the gold; another hole may be made and a similar process gone through. From these retaining points the gold is built up in the usual manner until all traces of mercury are lost.

Then the hand plugger may be replaced by the engine, electric or hand mallet plugger until the cavity is full. Polishing is better done at some future time, but the masticating surface may be finished, grinding the matrix and gold at the same time. Where the matrix and tooth-walls are pretty even, precipitated gold may be substituted for the first layer in place of small cylinders, as with this plan the difficulty of the rolling of the first pieces is avoided. Cylinders may be proceeded with as described above. Although the amalgam is to be introduced second in order, it should be mixed first and held during the mixing of white plastic between the finger and thumb of the left hand ready for immediate insertion. In this way the utmost penetration and adhesion of the oxyphosphate is obtained on the one side to the tooth substance, and on the other to the amalgam.

The experiment of sawing through a plug so constituted is easily made, and the union of the gold with the amalgam is seen

to be very perfect. It may be mentioned that the amalgam should be mixed to a granular condition, and not washed or ground in a mortar, nor should the individual particles be incorporated in the hand into a paste, as their irregularity helps to increase their mechanical hold on the osteoplastic lining.

An expanding pulley was shown, the object of which being that the speed of the bit may be increased without increasing the body motion of the operator.

Mr. G. NORTHCROFT, L.D.S., D.D.S., gave a demonstration of a "Banded Logan Crown," the demonstrator explained the three different methods already in vogue for banding Logan Crowns, and his reasons for thinking a Banded Logan surpassed all other crowns when used in the proper place. The demonstration was on a first upper bicuspid, and type-written sheets were handed round, showing the stages of the operation.

1. Preparation of root (the root having been rendered aseptic); grind level with gum (new safe-sided stone); treat with cocaine; trim off all enamel making root conical; ream out with nerve drills; fill with "G. P. points" dipped in eucalyptus; enlarge canal with "Hern Burr."

2. Preparation of Band; 22K. gold No. 4 gauge (narrow width); bend to shape in mouth (use of dentimeter); solder band with "OO"; bevel root under gum; grind band level with root; burnish platinum plate over all and solder with "No. 1."

3. Preparation of Logan for banding; roughly grind level, fitting between teeth, and adjusting to bite; slit platinum, and fit through; take off and pack Logan with gold; fit again and take off together; invest in pumice and plaster, and solder with "No. 3"; grind porcelain to band; polish; cement with oxyphosphate.

The operation was divided into three stages. In the course of the demonstration new safe sides of celluloid for carborundum stones were shown, and a method of preparing "G. P." points. To further explain his methods the demonstrator had prepared a series of five little models, showing the different stages of the process from start to finish.

Mr. OSWALD FERGUS, L.D.S., D.D.S., showed his "Phantom," which consists mainly of three parts:—A brass rod which is to be attached to the back of a dental chair, and upon which are fitted two brass representative jaws, which have each a moderately deep groove or gutter in their alveolar regions. Into these grooves the teeth are secured by means of plaster of Paris, shellac, sealing wax, or similar substances, and it is during their insertion that attention should be given to proper spacing, which can easily be adjusted to the capacity of the student. The Introduction of roots, in place of teeth, allows crowning to be practised in almost any conceivable form, from which bridge-work is but a short and easy step. The demonstrator stated that he believed the "Phantom" would be of great use to students learning to fill and to extract teeth; to demonstrators, lecturers, and teachers generally.

Mr. J. A. FOTHERGILL, M.R.C.S., L.D.S., filled a second left upper bicuspid. He commenced with non-cohesive gold, and finished with cohesive, using the Bonwill Mallet.

Mr. R. P. LENNOX, L.D.S., of Cambridge, demonstrated the matrices of which mention will be found on page 209.

Mr. H. BALDWIN demonstrated a "signet ring crown"; Mr. E. COWPER, of Darlington, a case of congenital malformation of palate treated with a denture; Mr. J. T. JAMESON, of Newcastle, a collar crown with porcelain backing; Mr. LEONARD BROWN, the use of electrotypes copper models; Mr. W. G. ROUTLEDGE, an electric mallet and a low voltage electric motor which can be fixed to an ordinary dental engine; and Mr. T. HEADRIDGE, of Leeds, a special form of workroom tools.

REPORTS OF SOCIETIES.

THE ODONTOLOGICAL SOCIETY OF GREAT BRITAIN.

THE Usual Monthly Meeting was held at 40, Leicester Square, Mr. F. CANTON (the President) being in the Chair.

The minutes of the previous meeting having been read and confirmed, the following gentlemen were proposed for membership:—Messrs. S. R. Apthorpe, L.D.S.Eng., Bromley; H. B. Rowe, L.D.S.Eng., 7, Cavendish Square; and G. B. Webb, L.D.S.Eng., Guy's Hospital.

The following gentlemen were admitted to membership:—Messrs. Frederick Haynes, L.D.S.Eng.; C. H. Oram, L.D.S.Eng.; W. J. May, L.D.S.Eng.; and Leonard Brown, L.D.S.Eng.

The discussion on Root Filling, opened by Mr. H. Baldwin, at the previous meeting, was then resumed.

Mr. H. BALDWIN, at the request of the President, briefly recapitulated the points of his opening remarks.

Mr. W. H. WOODRUFF said he was a strong advocate of the immediate method. Though it was a bold thing to say, nevertheless it was a fact, that since 1886 he had practically never dressed a tooth, except, of course, in a case of acute periostitis, or if there were not sufficient time to go into the case thoroughly, and he got vastly better results than from what he called careful and continuous dressings. He could quite sympathize with those who feared to adopt such a course, for he himself began with great trepidation. Mr. Baldwin had said that greater thoroughness in the preparation of cavities, even by those adopting the dressing method, had resulted from the practice and advocacy of Immediate

Root Fillers. The Immediate method resolved itself into treating a case on a single visit. He would like to ask those gentlemen, who were advocates of the dressing method, if on the second visit the tooth had been found healthy why would it not have been advisable to have filled it on the first? Further, what would become of the products of the potential cavity, supposing a temporary dressing were placed in the root? Was it possible by any amount of dressing to get at the contents? It seemed doubtful if they were ever properly reached by the old method. Of course he was not speaking of those cases with a sinus, where antiseptics could be pumped through. With reference to methods of treatment, he agreed with Mr. Baldwin as to the difficulty of gaining sufficient access to the cavity, it was of the greatest importance to be able to get at one's work, but, on the other hand, he did not approve of enlarging roots with root reamers, at any rate not to any depth down, owing to the risk of passing the instrument right through the apex. He thought Donaldson's Cleansers better than Hooks, as one could get further down with them. The instruments should be introduced carefully, and the *débris* flicked up. As to disinfectants, he used peroxide of hydrogen, the action of which would be too well known to need description before that Society. After the root had been rendered thoroughly aseptic it should be well dried out. He should mention that he never used any disinfectants that would coagulate the albumen. For a filling, he used gutta-percha and chloroform, mixing it up to a creamy consistence, and introducing it on some particles of wool by means of a fine instrument. In some cases he passed up a wire and left it there if the root was small, on the top of that he usually put an oxyphosphate to seal in the filling. Sometimes there would be tenderness about the tooth for a day or two, but it nearly always subsided, in fact he had never had to extract a tooth on that account. The application of capsicum plasters or iodine, usually removed the tenderness.

Mr. REDMAN (Brighton), while he was a believer in the Immediate method, nevertheless thought it was most important where there was a discharge of pus to dress the tooth for a few days. The great point was to cleanse the cavity. As to disinfectants, he used hydro naphthal, and found it most satisfactory. He generally filled with Weston's non-irritating stopping, packing it in with cotton wool

until it was well up to the apical foramen. After filling the root canal he always filled the upper part with phosphate, and then filled with gold or amalgam as the case might indicate. One of the most important advantages of the Immediate method was, the free access obtained to the cavities ; he would much rather cut away a good slice of the tooth than run the risk of not being able to get at the seat of the mischief thoroughly. Mr. Baldwin seemed to have gone into the matter so fully that it was superfluous to supplement his remarks. He could entirely endorse, his statements, and in the majority of cases he used the Immediate method. In conclusion he would say that when he got any tenderness he used the fluid extract of Jamaica dogrel, which, in his opinion, had a far better effect than aconite or iodine.

The SECRETARY read a letter from Mr. W. Cass Grayston, of Scarborough, in which he gave his experience, gained from every day practice. He wrote as follows :—"Take a septic root, without complications, cleanse it thoroughly with instruments, using, in connection therewith, any of the antiseptics favoured by immediate root fillers, such as peroxide of hydrogen, perchloride of mercury, or carbolic acid. When the root is clean and apparently sweet, fill it loosely with cotton wool, and the cavity of decay with temporary gutta-percha. Now if this cotton wool is removed after two or three days it will be found to smell very badly. Presumably this is due to the dentine giving up the odours of putrefaction, which it had previously absorbed, and which the Immediate treatment had been powerless to remove. Is it a clean or scientific operation to cork up this malodorous vapour by immediate root filling? Probably Mr. Baldwin is right in saying "There is nothing to support the idea that the pericementum can ordinarily be infected through the substance of the dentine and cementum," but it has been stated (I believe by Mr. Kirby) that water can be driven right through a tooth, and, if water, why not infectious vapour? But granting that the pericementum can only be infected through the apex of the root canal, have we any means of hermetically sealing this opening with a certainty that it will *remain* sealed in the majority of cases? During the last twelve years I have tried many methods of root-filling, but the perfect method has yet to be discovered. Many materials are difficult to insert, and the work being done—so to speak—in the dark, renders

accuracy of manipulation always doubtful. Some materials are easy to insert, and very perfectly fill the root canal for a time, but eventually they are either absorbed, or they shrink, or they become porous. Given a clean and thoroughly disinfected canal, there is no operation in dentistry that will give such good results, for imperfect work, as root filling, but it is necessary for the tooth to be thoroughly disinfected, and we do not get this by the Immediate method, I have practiced the Immediate method, and for a time, at any rate, achieved a success that astonished me, but I have no confidence in it as a general method of practice. Since the value of certain of the essential oils has been brought before the notice of the profession, notably the oils of cassia, cinnamon, and peppermint, the treatment of roots, by the dressing method, has been simplified and greatly improved, and if these oils are used, as advised by Dr. Harlan, it is rarely necessary to spend much more time than would be occupied by the Immediate method, and particularly so if the patient has appointments for other teeth to be attended to at the same time. I quite agree with the general principles advocated by Mr. Baldwin, and also consider, with him, that an experience of Immediate Root Filling is most valuable."

Mr. F. J. BENNETT had been, for some time past, waiting with some amount of curiosity to learn how far Immediate Root Filling would supersede other methods. He was satisfied that, in Mr. Woodruff's hands, Immediate Root Filling was a great success, but, as far as he could judge, those who advocated it did so upon two grounds, firstly, that it was a quicker method, and secondly, that it was a better method. With reference to the second point, he thought Mr. Baldwin was hardly fair in saying, that one got a better opening and a more thorough cleansing by it; it was a little hard upon those, who had practised the orthodox methods with ample success in years gone by. In consequence of that success it was clear that the roots were thoroughly well cleansed, for, if not, it implied that germs must still be there, and he could not see how that could be if the teeth had gone on comfortably year after year. It must, therefore, be granted that under the old methods the work was thoroughly done, and for the new method it could only be claimed that it was quicker. There were two points he would like to mention, the first was, that he did not consider that micro-organisms penetrated to the periosteum in any other way than

through the middle of the tooth. He was not aware that this had ever been put to actual proof by the aid of the microscope, but in his opinion micro-organisms of putrefaction would be found present in the dentinal tubes, and also in the cemental cells, and in that way would get to the periosteum, otherwise he could not account for those cases where one found the apical foramen much reduced and three or four vascular canals penetrating the side of the root passing upwards to the pulp cavity. There were other evidences of extreme activity in that region, and he was convinced that there must be some irritation produced by the organisms passing directly through the substance of the root, through the periosteum, without going through the apex. Another point was with regard to the question of abscess, he thought Mr. Baldwin said that he was not quite sure what was the condition of the abscess, whether the cavity dried up, or whether the cells came together, or in what condition it was found ultimately. The point was raised whether micro-organisms or antiseptics could penetrate into the abscess cavity when it existed. It was perfectly certain that they must do so; undoubtedly those teeth were curable after being dried once or twice; he could only conceive it possible that they were cured by the destruction of the micro-organisms by the action of antiseptics. Some might say that being deprived of air the micro-organisms became inert, that might be a possible position, but he should say that the antiseptics had penetrated to the abscess cavity, and unless it were proved to the contrary, he thought one was justified in such a position. He had been very much impressed by the remarks of Mr. Baldwin and the other speakers.

Mr. R. H. WOODHOUSE had not the advantage of hearing the paper read, but from Mr. Baldwin's excellent summary, he gathered that there were one or two points which he did not mention. With regard to two out of the three classes of cases for Immediate Filling, he could shake hands with those who adopted the method. Where a nerve had been destroyed by arsenic, and carefully removed, there was no reason whatever why the fang should not be at once filled and the opening closed, so as to prevent any further contamination. In the second class (where there was a sinus at the end of a fang), Immediate Filling might be adopted, every precaution being taken to remove all aseptic matter and get the antiseptic solution to pass through the sinus so as to thoroughly cleanse it. With regard to

the third class of case to which Mr. Woodruff alluded, though he (Mr. Woodhouse) hoped he was a fairly plucky practitioner, and he trusted also a careful one, he had not quite come up to the position of filling such cases without a little preliminary treatment. If there were any discharge down the fang, he was certainly very diffident about closing up the cavity, at all events, for a few days. With regard to disinfectants, there was one which had not been mentioned that evening, namely, iodine linament; he had found it give better results than any other antiseptics in those long cases of carious teeth, where the fangs had been very unhealthy, and had been in that condition for some time; it entered very readily into combination with any albumunoids that might be present and rendered them inert. He left the fangs full of the linament for two or three days, and they had gone on exceedingly well, as a rule; if he had used any other disinfectant, he should not have felt the same confidence. After destroying the nerve, he did not usually put in the filling of metal at once; he found it better to insert a gutta-percha filling for a few weeks.

Mr. J. F. COLYER thought that there were a few points which had not been touched upon. Like Mr. Woodruff he was rather given to Immediate Root Filling, and, with many others, he had at first thought it somewhat risky, but he had come to the conclusion that the adoption of the Immediate method was largely a question of pluck. He understood Mr. Baldwin to be of opinion that pericementitis was more frequent after the immediate than after the dressing method, but he (Mr. Colyer) did not think that this was the case. If he thought he could get better results from the latter method he should go back to it, but, on the contrary, he was inclined to agree with Mr. Woodruff that the best results were obtained from the former plan, which he had practised for the past four years. He had been watching anxiously for the results of some of the cases treated four years previously, but was unable to recollect a single instance of having had to extract teeth filled by the immediate method. He agreed that the advocates of Immediate Root Filling had taught them to be very much more careful in the treatment of roots, and in the removal of débris from the canal. An important point, for which he was indebted to Mr. Woodruff, was not to remove the débris too quickly, but this of course applied equally to the immediate and the dressing method. The risk of pushing septic

matter through the apex would be better avoided by adopting a slight rotary rather than a pumping motion. With regard to the instrument, he did not favour a reamer; he thought a canal treated without reaming could be filled much better. He, however, used reamers where the dentine had been thoroughly softened, and in such cases they were very useful. The class of cases he found difficult to treat were those with large apices, in such instances he believed rizodontrophy was sometimes useful. On two occasions he had adopted the method of sponge grafting, recommended by Mr. Brunton, with great success. Mr. Brunton's plan was to pass up through the apex, right into the apical space, a sponge graft, rendered thoroughly aseptic, and leave it there. He would be glad to know if anyone else had had experience of this method; it certainly seemed to provide an additional method of filling these root canals. With regard to drugs, he should be glad to hear if anyone had had the experience of a drug mentioned at the Chicago Congress called kalium natrium. The mode of its application was to pass it straight through the pulp of the canal on a Donaldson. It was claimed for this drug that it united immediately with the fatty material in the root and sterilised the canal at once, the heat generated acting to a certain extent as a germicide. From his experiments out of the mouth, Mr. Colyer was sanguine that the drug would prove to be the best for treating small buccal root canals of upper molars, and the anterior roots of lower molars. He had twice tried it on teeth in the mouth, and in both cases with success. Another drug he would like to recommend was sodium peroxide, which he preferred to peroxide of hydrogen. It possessed the advantage that there was a greater amount of oxygen available, and consequently, when it united with the fatty materials in the canal, not only was the oxygen set free, but a soap was formed which very much facilitated the cleansing of the canal. Dr. E. C. Kirk, had written an interesting article in the "Dental Cosmos" about this drug, and the more he (Mr. Colyer) used it the better he liked it. With respect to treating canals by the Immediate method, when pus was present, it being a cardinal doctrine of the Immediate filler that the root must be dry at the apex, he did not think he would recommend such a course. He might mention that three and a half years ago he treated, by the Immediate method, the right upper lateral of a medical man, in which for some months cotton wool had been inserted to soak up the discharge coming from a

chronic blind abscess. He inserted a large gold filling, and it had remained perfectly sound and tight since. He could only explain his success on the theory that the peroxide destroyed any organisms existing in the cavity. The treatment of buccal roots had always been a difficulty to him, and whenever he could not get a Donaldson up the canal he left them alone. One of the American Journals had recently recommended the use of a 50 per cent solution sulphuric acid, the theory being, that by introducing it into the canal the dentine was softened; the plan was highly spoken of, and he thought was worth a trial. He had great difficulty with root canals having semi-calcified pulps. Many of the members would be aware that Dr. A. W. W. Baker read a paper at the Newcastle Meeting on this subject, and gave the results of his experiments with sublimate. He was glad to hear Mr. Redman speak of the necessity of opening up canals thoroughly. It seemed to him (Mr. Colyer) that very little was known of the architecture of a tooth, and he thought that much of the tissue was often cut away unnecessarily. After they had cut away the posterior surface of a second bicuspid it was not an uncommon thing to find, after about six months, that the wall gave way. He thought that a method of opening into a chamber without removing so much of the tooth structure might be found.

Mr. T. G. READ said, with regard to the bristles used, he thought that those usually supplied were too thick and too smooth; a smooth bristle was very awkward indeed to wind a dressing on. Concerning root fillings, in most cases he preferred very thin gutta-percha dissolved in chloroform. In a few cases, where one could not remove all the pulp, he thought oxychloride of zinc seemed to answer the purpose very well. He did not like the idea of putting wool into the canal, as mentioned by Mr. Baldwin, for if a piece was left in, the canal could not be thoroughly drilled out and septic fluid might be driven into the apex.

Mr. STORER BENNETT said that, in his judgment, the whole question of the successful treatment of roots entirely hinged on their being thoroughly cleansed and rendered aseptic; whether this was done in a single visit, or in several visits, he thought was immaterial. While willingly admitting that a considerable amount of trouble was taken by the advocates of the Immediate method, he thought more was claimed for them, than was perhaps intended, when it was said

that they took so much more trouble in cleansing their roots than the exponents of the older method, and obtained thereby a proportionately greater success. He agreed with his brother (Mr. F. J. Bennett) in thinking, that a very large amount of exceedingly good work had been done, and was being done, by those who had never attempted the Immediate method. With reference to the use of such drugs as peroxide of sodium and sodium potassium, of which Mr. Colyer had spoken, in view of the fact that they generated gases, and that the necessity for extreme care in not forcing putrid matter through the apex was urged, it would appear that they would be running considerable risk of doing that which it was desirable to avoid in using any drugs which generated oxygen. It might be argued that, even if putrid matter were forced through the apex, it would be rendered aseptic by the action of the drug, but if that were true it would be safe to fill the canal with that portion of the pulp in it. Mr. Baldwin seemed to lay a little too much stress on the care taken to open up the root canal properly by Immediate Root Fillers, but he was quite sure that a large number of practitioners did open up root canals under the old method so as to gain full access to them, and it would be remembered that Mr. Hern read a paper some years ago—before the period of Immediate Root Filling—showing how he considered the root canals of various teeth should be treated. There was one little point upon which he should like to be instructed upon, *viz.*:—the pathology of what Mr. Baldwin called the potential cavity, and also the abscess cavity. He did not understand how they could get any eating away, or erosion of bone, at the end of a tooth, which became either filled with granulation tissue, or occupied by an abscess sac containing fluid. He did not understand how that cavity could exist and could be washed out and dried so thoroughly that no discharge came from it, and that gutta-percha, or any other dry substance, could be put into the root canal and produce a filling up of the bone cavity or a safe condition of that cavity. Once more, he would like to give his testimony to that much abused drug iodoform; he was quite sure that, clinically, very valuable results had been obtained from it, and he thought that it was only fair that, so long as they obtained such results, they should give the credit of them to the drug, no matter what might be shown by bacteriological cultivations.

Mr. BEADNELL GILL asked how they were to distinguish the safe cases for Immediate Root Filling from the unsafe ones.

Mr. H. BALDWIN, in reply, said that he feared that the short outline of his opening, which he gave at the commencement of his discussion, had produced rather a false impression. He was not himself an Immediate Root Filler of at all a pronounced type, but the position he took up was, that with a certain number of dead teeth it was certainly safe to fill immediately, while it was at all not safe to treat a certain number of others in that way, and one could not always be certain beforehand, of even those cases, that were safe, and, therefore, if there was any doubt about it, it was better to put in a trial filling, then if trouble afterwards arose the filling could be easily removed. Mr. Woodruff had asked if on a second visit a fang was found pretty quiet, why should it not have been filled on the first? His reply was that it was not possible always to say on the first visit that it would be found quiet on the second, nor could they be certain that it was going to remain quiet. Then the question arose as to the possibility of disinfecting a potential cavity. He believed it could be done with peroxide of hydrogen or some volatile antiseptic, at any rate, if it was not rendered quite a septic it was sufficiently so to enable natural processes to deal with the organisms. Then as to treating a sinus from the outside, he thought that pumping the antiseptic through was the better method if the cavity was fairly small, but there were cases where a cavity could not be washed out in that way and must be considerably enlarged on the outside with an escharotic and a drainage tube put in. With regard to the use of nerve canal drills, he thought it better, unless the canal were very large, to use the fine drill as far as it would go with moderate pressure, taking care not to let it slip through the end; it should go as far as possible towards the apex, because it made the canal easier to fill and the stopping could be removed with greater facility. It was also a very complete way of removing particles from the canal, for sometimes a Morrey or Gliddon drill would get out particles that could not be got out in any other way. As regards the shoulder of dentine, if a properly shaped Morrey drill was used, the drill terminates in a probe point, and the cutting wings fine away to nothing towards the point, so that no shoulder would be possible. He could agree with Mr. Woodruff as to the value of chloroform as an antiseptic, especially if mixed with eucalyptus

oil. With regard to the frequency of extractions necessary after the Immediate method, he thought that the percentage of failures were usually put enormously high, at two or three per cent. he should be inclined to put his own failures, after filling dead teeth where found dead, at about one per mille. He thought the most dangerous teeth of all to fill immediately were lower bicuspid's where there was any pus welling up through the root. He did not know why, but perhaps it was because the root was very long and had to drain upwards. Mr. Redman had spoken of the antiseptic oxyphosphate cement as a good root filling, but Mr. Baldwin preferred gutta-percha because it was so easily removed. For the same reason he objected to Sullivan's amalgam, on account of its difficulty of removal if one wanted to crown a tooth. With regard to the permeability of dentine, mentioned in Mr. Grayston's letter, and the possibility of forcing water through it, he believed that water could be forced through any known substance, but he thought that Mr. Paterson's experiments some years ago proved that dentine was not very permeable.

Then as to whether micro-organisms could travel along the dentinal tubules; this was not the question he raised, but whether the pericementum could get infected in that way, and he did not think it could unless there were pathological changes, which existed only rarely. Mr. F. J. Bennett thought that he (Mr. Baldwin) had given too much of the credit to Immediate Root Fillers for the increased thoroughness in cleansing root canals so much more prevalent now than prior to the introduction of the method, but he, (Mr. Baldwin) did not go the length of saying that others, under the old method, had never been thorough, but the necessity of thoroughness had been more particularly accentuated by the exponents of the Immediate method. Then with regard to rizodontrophy, it sometimes gave good results for a good number of years, but very frequently it did not, and upon the whole he was inclined to regard it as a slovenly method. Mr. Bennett had said that abscesses were usual in chronic dead teeth, but he (Mr. Baldwin) was of opinion that most dead teeth have no abscess, and even no inflammation around them. Mr. Colyer had rather misunderstood him in stating that he had said that pericementitis was more likely to occur after Immediate Root Filling; his position was, not that it more commonly occurred but that it was better to put in a trial filling in case it

should occur. Mr. Storer Bennett asked a difficult question as to what was the pathology of an abscess cavity in the jaw. Very often he thought there was an actual cavity filled with pus, and then again one had cases where there was no actual cavity. In his opinion the septic matter in the root produced periostitis, followed by osteitis, necessitating the removal of the bone, and one got granulation tissue left. In many cases, where there had been a large abscess cavity, filled with pus, it would, to an extent, heal itself by the growth of soft tissue. Mr. Gill desired to know which were the safe and which the unsafe cases. In Mr. Baldwin's opinion the latter were decidedly those where pus existed, and it was impossible to get satisfactorily to the apex of the tooth. Most of the other cases were safe, but he thought it was better to put in a trial filling in the first instance.

THE PRESIDENT having announced that the next meeting would be held on the 7th of May, the usual votes of thanks terminated the proceedings.

MR. W. DAVIS, F.C.S., of Bristol, sends us details and photographs of a new model Compound Bacteriological Microscope, for high-power work. The new features of this microscope are—the rack draw tube panelled and rifled; the lever grip limb and the lean back standards to tripod; the patent draw tube has the advantage over the old pattern of being lacquered, thus always presenting a bright and new appearance when racked out; the external tube is hypermetrical to admit the rifled bearings; the patent limb is so constructed as to give the operator a firmer grip and greater power in levering from the vertical to the oblique or horizontal position as required in photo-micrography; the patent lean-back standards are so designed as to place the tripod joint in the rear of the stage and out of the way of the operator. As all space is economised in this instrument it presents a remarkably short and engine-like appearance being only $11\frac{1}{2}$ inches in height when racked down. The focal length of the tubes combine the English and French standards both for the highest as well as the lowest powers. The tube is so placed on the limb as to be most convenient for short corrected objectives and racks back by coarse adjustment for lower powers. The fine adjustment is most sensitive, and specially arranged for bacteriological investigation. The manufacture of this instrument is of the highest order, and from the original models as designed by the patentee.

THE DENTAL RECORD, LONDON: MAY 1, 1894.

MECHANICAL TRAINING IN DENTISTRY.

DENTAL matters revolve in a somewhat narrow orbit. The same question reappears, in various disguises, at short intervals. It must needs be so, yet, though the points claiming our attention may be so few, they are, to us, of so great an importance that we may, perhaps, be pardoned returning to one touched upon not very long ago. At the meeting of the British Dental Association, at Newcastle, the paper of Mr. George Cunningham, on the methods of training dental students in mechanical dentistry, led to a discussion and a division, which was of great interest, as showing the trend of thought with regard to the debated point, private pupilage *versus* hospital mechanical training. It has long been felt, by those who have devoted attention to the matter, that with the growth of the hospital training of our students, the mechanical pupilage has ceased to afford that preliminary training which it could and should. Thus, though the modern dentist may be better equipped in the more surgical and scientific branch of his work, he is, in mechanical skill, hardly the equal of his pre-hospital ancestor. Easy as it may be thus to state the condition, the remedy is by no means so briefly determined. One suggestion is to mend the existing state of affairs, by introducing an examination in mechanical dentistry, which a student must pass before he can enter upon the second, or hospital part, of his training. Thus, it is hoped, pressure will be brought to bear on the pupil and on the practitioner to whom he is articulated. The other idea is, that the student shall be trained in a school of technicology, as a separate institution, or attached to the existing dental schools. Whichever plan may ultimately be adopted,

must largely depend on the verdict of the profession, as a whole, and, therefore, we would endeavour to set down what appear to us to be the claims and objections to each.

The boy, who is articled to a conscientious and able man, will certainly, not only have abundant opportunity of learning his work, but will also obtain the personal teaching and future interest of a friend. He learns something of the routine and details of a practice, he sees a good many of its difficulties. The very necessities of a workroom compel endless repetition, and slowly his fingers obtain that skill, which marks the professional worker from the amateur bungler. At times, towards the close of his career, he will find himself left to face difficulties alone, thus trying his mental and mechanical resources, and teaching him self-confidence. Nor should we forget the moral effect of regular hours of daily toil, of having to forego a pleasure excursion or an idle hour because work calls. How would a school compare with these? He becomes a student. He is but sixteen or seventeen, perhaps, he meets men older than himself, who indulge in the freedom of student revelry. He may be from home, possibly in rooms, probably in the moral atmosphere (save the mark!) of a residential college, where he first learns to burn the midnight oil—but not of study. During the day he has classes, where he is told and shown, and, perchance, does all that is excellent in a systematic course of mechanics. But the repetition, the hard experience by which a boy really learns, these will doubtless attract the diligent, but the lazy, who will pin them to the task? Surely we all of us call to mind many an individual, whom we laughingly called “a chronic” in our student days. The species is, we fancy, more abundant among medical than dental students. True, the examinations of the former are much more severe, but we believe the period of pupilage has impressed the latter with the realities of life, and the need of working, even if, later on, he plays equally hard. To our mind, it is idle to compare the training in such an institution

with the hospital work of the student of to-day—we fail to see the parallel. Indeed, if we learn a lesson from the present students, it would be this:—they do just the amount of mechanical work they are obliged to, and generally do that but indifferently well.

To sum up, the mechanical training of dental students must be improved, and this, we believe, would be best done by bringing pressure on practitioners, who take pupils, and who are either wholly incompetent (for lack of mechanical knowledge is not confined to students), or otherwise unable to teach them. A stiff mechanical examination at the end of a pupilage, which should be of three years duration, would effect this. Master and pupil could not but feel the useful pressure of such an impending ordeal. But we would by no means absolve the dental schools from sharing the responsibility, on the contrary, we believe the time has come, when the curriculum of a student would well bear adding to, both by increasing the number of lectures of the courses now required, and by adding to them others of a practical nature. Indeed, it is possible, the true solution might be found in a compromise, *i.e.*, by letting a two years' pupilage be followed by a year's training in a school teaching mechanics, both theoretically and practically.

News and Notes.

THERE is a vacancy at the Dental Hospital of London for a Demonstrator, also for two Assistant Anæsthetists. Applications by May 14th.

THERE is also a vacancy at the National Dental Hospital for a Demonstrator.

THE next Meeting of the Odontological Society will be held on Monday, May 7th, when Dr. David Hepburn will open a discussion on "The Retention of Artificial Dentures in Edentulous Cases."

THE next Examination for the Dental Diploma of the Royal College of Surgeons, England, will commence on the 14th inst.

WE are informed that the Students' Society of the National Dental Hospital intend giving a *Conversazione* in the New Hospital on Wednesday, May 23rd, and are asked to state that all Old Students, and friends, who have not received notice of the same, should at once apply for tickets to the Honorary Secretary of the Society, Mr. H. W. Tice, at the Hospital, Great Portland Street.

THE Journal of the British Dental Association makes the following brief announcement:—"We are informed that, both Mr. C. Lloyd Williams, and Mr. W. H. Dolamore have resigned their posts as dental surgeons to Westminster Hospital as a protest against the statements made by Dr. Hebb, in his opening address at the commencement of the Winter Session, October, 1893."

AT a Quarterly Meeting of the Council of the Royal College of Surgeons, England, held on April 11th, the report of the John Tomes' Prize Committee was presented, in which the following regulations were recommended for adoption:—"The prize, which is to be triennial, shall be open to any person registered under the Dentists' Act of 1878 who shall hold a diploma in Dental Surgery of one of the licensing bodies in Great Britain or Ireland, and is to be awarded for original or other scientific work, done either partially or wholly within the triennial period, on the subjects of Dental Surgery and Pathology, Dental Anatomy and Physiology (including Histology), or Dental Mechanics. No essays shall be submitted in competition for the prize in the case of the first award, which shall be for the period ending Dec. 31st, 1896." The report was approved and adopted.

AN application, by the Incorporated Edinburgh Hospital and School for a donation out of the residue grant, was before the Town Council of that City, on April 16th, the application was remitted to the Lord Provost's Committee.

IN our next issue we shall publish the first of a series of articles on "Dental Microscopy," by Mr. Hopewell Smith. These are intended as guides for practical work, and detail the means, which the writer has found of use in his own work. Each paper will be illustrated by beautiful reproductions of drawings from slides specially prepared by Mr. Hopewell Smith for these papers. We venture to think that these plates have rarely been equalled and never surpassed in dental literature.

A SOMEWHAT unique exhibition of pictures will be held in the Galleries of the Royal Institute of Painters, in water colours, Princes Hall, Piccadilly, from June 23rd to June 30th, on behalf of the Building Fund of the Dental Hospital of London. Only pictures sent in by invitation will be hung, and, as the following have, among others, kindly consented to lend pictures a rare artistic treat may be anticipated. Sir Frederick Leighton, P.R.A., Sir James Linton, P.R.I., L. Alma Tadema, R.A., Phil. Morris, A.R.A., Dendy Saddler, Jan. Van. Chelminski, and Solomon J. Solomon. The pictures will be hung by Alma Tadema, and the Committee of Management are Mrs. Knowsley Sibley, Messrs. Alma Tadema and George Rowell and the Dean of the School. During the afternoon the Anglo-Hungarian Band will play, and concerts will be given, at which eminent vocalists will sing.

A DEATH from cardiac syncope, during chloroform anæsthesia, induced for the extraction of teeth, occurred at Sydney, on February 23rd last. The patient was a healthy woman of twenty-six years of age, the mother of three children. The medical evidence, given at the inquest, showed that there were no signs contraindicating the administration of chloroform and the Government Pathologist deposed to finding none on a post-mortem examination. About half-an-ounce was given. The patient appears to have struggled during the administration. Twenty-three teeth had been extracted when the patient turned pale, the pulse ceasing, artificial respiration was kept up for about twenty minutes, without result.

THE Twentieth Annual Meeting of the Shareholders of the Dental Manufacturing Company, Limited, was held at the registered offices, 6/10, Lexington Street, W., on the 7th April. The Chairman of the Company, Mr. D. D. Hepburn, L.D.S.Eng., presided. In presenting the Accounts and the Directors' Report to the meeting, the Chairman congratulated the members present upon the prosperous condition of the Company. A dividend at the rate of five per cent. per annum was declared, and the balance of profit on the year's working, after providing for depreciation of plant, was carried forward to the next account.

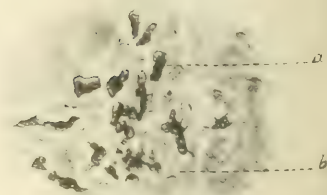
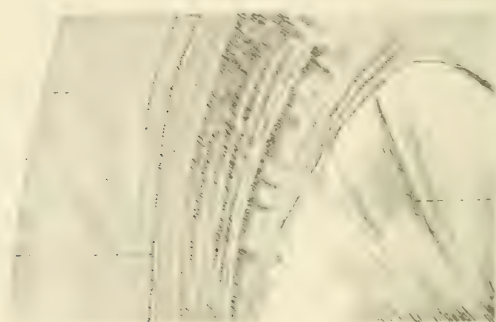
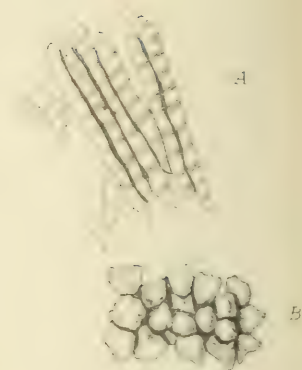
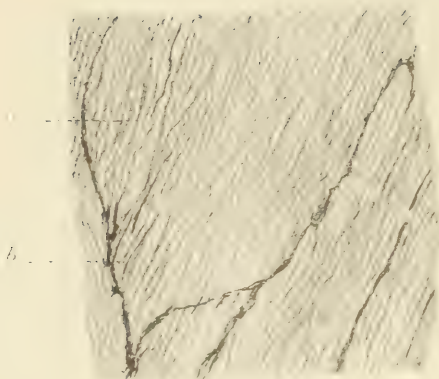
AT the Marylebone Police Court, on April 10th, John Smith, 57, an engine-driver, of Rochester Road, Kentish Town, was brought up before Mr. Plowden, charged with stealing a quarter of an ounce of platinum, worth ten shillings, belonging to Messrs. Claudius Ash and Sons, of Angler's Lane, Kentish Town. John Seed, manager of the firm, said that when stock was taken last January it was found that there was a deficiency of platinum amounting to 763 ounces, which represented a sum of £1,500. The prisoner was committed for trial.

YET ANOTHER DEATH THROUGH SWALLOWING FALSE TEETH.—At the Manchester City Coroner's Court an inquiry was held on April 16th, by Mr. S. Smelt, respecting the death of William Henry Mott, aged thirty, lately living in Oakworth Street, Blackley. On Wednesday morning the deceased was having breakfast, when he suddenly rose and went into the yard. He did not say anything when he returned, but finished his breakfast and then went to work. During the day he became unwell, and on his return home told his mother that he had lost his false teeth, adding that he believed he had swallowed them. He was taken to Dr. Coutts who made an unsuccessful attempt to recover the teeth, which he said he could feel in the throat. The following day the doctor called again, and on his advice the deceased was taken to the infirmary, where the teeth were recovered. Subsequently the man's breathing became difficult, and it was found necessary to perform the operation of tracheotomy. He died on Saturday morning. In reply to a juror,

Mr. J. W. B. Smith, resident surgical officer at the infirmary, said, had he known on Wednesday night that the deceased had swallowed his false teeth he would have said the sooner they were removed the better. In the case under notice it was extremely difficult to detect the presence of the teeth. On one occasion he saw a woman at the infirmary who was said to have swallowed her false teeth, which were, however, subsequently found on her dressing-table. The jury expressed the opinion that Dr. Coutts should be censured for not sending the deceased to the infirmary on finding that he could not recover the teeth on the Wednesday night. The Coroner thought it only fair that the doctor should have the opportunity of making an explanation, and he adjourned the inquiry for a short time for that purpose. Later in the afternoon Dr. Coutts attended and explained to the Coroner, and jury that when the deceased was brought to his surgery on the Wednesday night he did his best to remove the teeth. He managed to dislodge them once, but they fell back. He thought that any further attempt would only have been hurtful to the patient, who was not robust by any means. The Coroner pointed out that the jury, thought it extraordinary that the teeth should have been left in the throat from the Wednesday evening till the following afternoon. There would have been a better chance for the man's life if an operation had been performed at once. Dr. Coutts repeated his previous assertion that if any further attempt had been made to remove the obstruction on the Wednesday night it would only have hastened the end. He was not able to see the patient until nearly two o'clock the following afternoon, having to attend other patients, who were in an equally dangerous condition. A Juror: It is like playing with the lad's life. The doctor added that as soon as he found it advisable to send the case to the Infirmary he made all the arrangements necessary. He had done his professional best, and had acted as he should act again under similar circumstances irrespective of the opinion of the jury. When he first saw the deceased he did not think it necessary to send him to the Infirmary, as he was in the habit of performing his own operations. The jury did not consider the doctor's explanation satisfactory. Dr. Coutts applied for his fee for attending court, but unsuccessfully, the Coroner remarking that if his explanation had been deemed satisfactory by the jury the fee would have been allowed.

Below to Record
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Description of Plate I.

Fig. 1.—Longitudinal section of enamel, human : ground down : unstained : $\frac{1}{8}$ in. obj. and A ocular : shews (a) prisms : (b) fissures produced by grinding.

Fig. 2.—Human enamel, decalcified : stained picro-carmin : $\frac{1}{12}$ in. oil immersion and C ocular : shews (a) longitudinal section, striæ, and interprismatic substance : (b) transverse section of same, shews the outline of the prisms.

Fig. 3.—Striæ of Retzius (human), ground down : stained orange rubine : 1 in. obj. and A ocular : shews (a) enamel : (b) free edge of enamel : (c) striæ of Retzius : (d) dentine.

Fig. 4.—Pit in enamel, with Nasmyth's membrane *in situ* : ground down : unstained : $\frac{1}{12}$ in. obj., C ocular : shews (a) enamel : (b) Nasmyth's membrane : (c) lacunæ : (d) interprismatic substance.

Fig. 5.—Lacunal cells from Nasmyth's membrane ; decalcified : unstained : $\frac{1}{8}$ in. obj. C ocular : shews (a) cells : (b) homogeneous matrix.

THE DENTAL RECORD.

VOL. XIV.

JUNE 1ST, 1894.

No. 6.

Original Communications.

DENTAL MICROSCOPY.*

BY

Mr. A. HOPEWELL SMITH, L.R.C.P., M.R.C.S., L.D.S.

INTRODUCTORY.

IN response to the invitation of the Editor of this Journal, the writer has been induced to put together a few notes on the practical workings of Microscopy, as applied particularly to Dental Histology.

It is interesting to observe how rapidly this special branch of work has of late years advanced, and how many of the younger members of the profession are taking it up. By the establishment of special classes for Dental Histology, at the various schools; by a much needed examination, in this subject, at the termination of the student's curriculum; and, by the wide fields of research still open to the original worker, it will be readily seen, that we have to deal with a question of no mean importance. This fact is now recognised by the members of the

*NOTE.—The drawings throughout this work are made for the most part, from original photographs.

British Dental Association, at whose Annual Meetings, papers, demonstrations, and discussions form an interesting and valuable feature.

*Reasons for
Publication.*

The Manuals of General Histology, which are present day text-books, refer but very briefly to this special subject: mere outlines of practical work are, as a rule, only given, the demonstrators, at the schools, adopting in class their own methods of carrying out the rules there laid down. With a view, therefore, of helping dental students in their work, it is the writer's desire, to place on record the details of those methods, chiefly in vogue at the present time, which he has found of greatest use; thereby hoping to stimulate individual work at home, as an addition to that of the hospital practical class. The notes will be didactic, helpful, and instructive. No attempts will be made to teach Dental Histology: students must rely, for this purpose, on their own lecturers and text-books.

The Illustrations.

These pages, however, will be accompanied by original illustrations, drawn by the author from his own preparations, and instructions will be given as to the methods recommended for making such specimens. The plates are thus intended to be a useful feature, and a help to the student. A short description will be found at the end of each chapter, in order that he, who has prepared and mounted a section, may be able, under the microscope, to recognise its various structures, and seeing, learn and interpret its meaning. He will thus become familiar with his own sections, and by comparison with those of others, quickly understand the broad facts of Dental Histology.

*General
Remarks.*

As with everything that requires for its proper performance the application of technical manipulative skill in addition to complete fore-knowledge of the

subject, so it is with Dental Microscopy. It is essentially made up of minutiae; it is a matter of much detail; and the student must begin at the very beginning, if he wishes to become a microscopist and histologist. Many difficulties will necessarily arise at first, but experience and practice will, in time, lead the diligent enquirer to successful and gratifying achievements.

The simpler the apparatus he employs, the better; the less complicated the method he adopts, the truer the results.

The Microscope.—A simple form of compound *Instruments.* microscope should be used at the commencement of histological studies, this being more suitable, firstly, because of the ease of management, and secondly, because it involves no great initial outlay. The shape, or size of stand, is immaterial, it should be heavy and quite firm: the objectives must, however, be good. *The Objectives.* These should be, for ordinary purposes, 1 inch and $\frac{1}{6}$ inch, which, with two eye-pieces—"A" and "C" or "D," as they are usually called—give a magnification ranging variously from 35 to 750 diameters. Later on, a $\frac{1}{12}$ inch, water or oil immersion, will be found indispensable for the examination of bacteria and for fine work generally. The microscope should be provided with rack and pinion or "coarse," and screw, or "fine" adjustments, and a reversible mirror. It is advisable to have a double nose-piece attached to the draw tube, much time and trouble being thus saved. This accessory is not, however, quite essential at first, and a mechanical stage need not be purchased until later. A sub-stage with focussing and swinging adjustments, an Abbé condenser, iris diaphragm, and bull's-eye condenser, on stand, make up the necessary primary equipments. The student should obtain catalogues

*Makers of
Microscopes.*

of the various instrument makers and dealers, among whom may be mentioned Messrs. Baker of Holborn, Beck of Cornhill, Powell and Lealand of Euston Road, Steward of Strand, Swift of Tottenham Court Road, Watson of Holborn, Frazer of Edinburgh, and Parke of Birmingham. It is invidious to make distinctions, but the writer can specially recommend Beck's "Star" microscope as being eminently suited, at first, for all the requirements of the student. It is a cheap form of instrument, but the objectives are certainly very good.

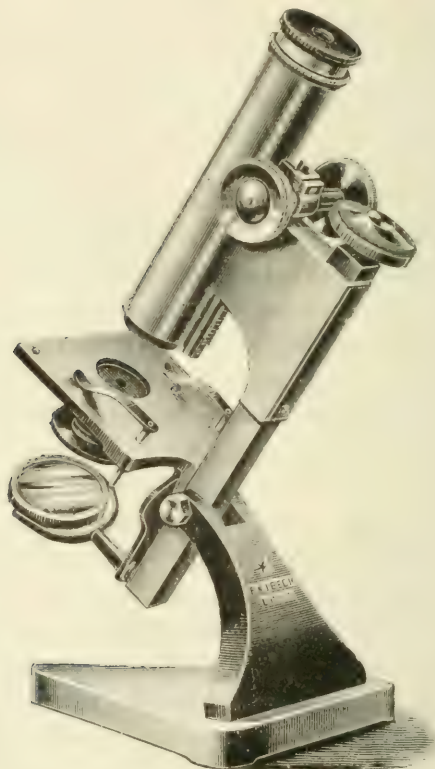


Fig. 1.

THE "STAR" MICROSCOPE.

The various parts of a microscope can be more readily understood by reference to the accompanying drawing than by a long verbal description.

*Use of Parts
of Microscopes*

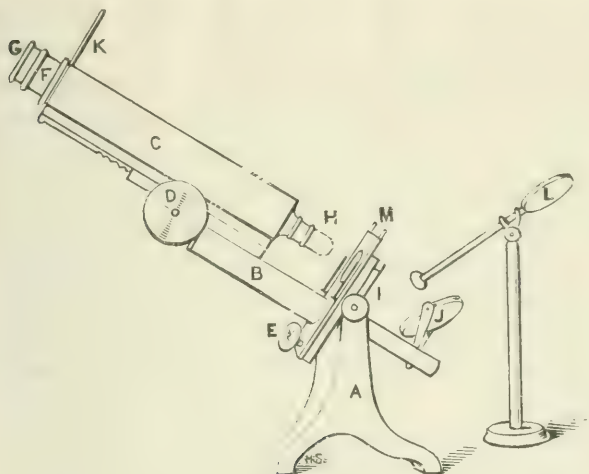


Fig. 2.

THE PARTS OF A MICROSCOPE.

- | | |
|---------------------------------|---|
| A. Foot or stand of microscope. | I. Sub-stage with Abbé condenser. |
| B. Limb. | J. Reversible mirror carried by tail-piece. |
| C. Body. | K. Screen mentioned in text (moved aside). |
| D. Coarse adjustment. | L. Bull's-eye condenser. |
| E. Fine adjustment. | M. The stage. |
| F. Draw tube. | |
| G. Eye-piece or ocular. | |
| H. Objective lens. | |

The uses and actions of these parts are briefly as follows :—

The *Foot* supports the microscope, and keeps it rigid and fixed in one position. It should be heavy and firm, and the form shown in the drawing, known as the Jackson, is the best, for it allows the instrument to be placed in a horizontal position without losing its firmness and support.

Limb. The *Limb* is very solid. It sometimes carries, at the end furthest from the foot, the fine adjustment.

Body. The *Body* is the optical tube through which the objects are seen. It is provided at one end with the objective, and at the other with the *Draw-Tube*, which accurately fits its interior. It is attached to the limb by means of a rack and pinion adjustment. Some cheap forms of microscope have no rack and pinion, but for convenience and usefulness, this is really necessary.

Objectives and Eye-Pieces. The *Objectives* and *Eye-Pieces* are the magnifiers, and the magnification of the object depends on these only, and not on the size of the stand of the microscope, as is sometimes supposed. The powers of the former are expressed as 1 inch, $\frac{1}{2}$ inch, etc. These terms do not indicate the distance at which they focus on the object, but mean the actual magnifying power of the objective. Thus, a 1 inch objective should have a power of 10 diameters, $\frac{1}{2}$ inch 60, and so on. The ocular again amplifies the image formed by the objective, 3, 5, or more times.

The Adjustments. The *Course Adjustment* raises and lowers the body, and is required for focussing with the lower powers. The *Fine Adjustment* is to be used with higher powers for very delicately focussing. The *Sub-Stage* carries the illuminating apparatus, Abbé condenser, and diaphragms for concentrating the light on to the object. The function of the diaphragms is to cut off circumfluent rays of light, and make the image well defined and bright.

Mirrors. The *Plane Mirror* is used for low powers by daylight and with the condenser. The *Concave* is employed when a maximum amount of light is required, and for high powers by lamp-light.

Stage The *Stage* holds the glass slide in position by means of clips.

The *Bull's-Eye Condenser* is necessary for *Condenser*.
condensing light on opaque objects, and for
photo-micrography.

A useful adjunct to the microscope is a home- *Screen*.
made *Screen* for protecting the eye. It should be a
dull-black piece of carboard, 2 inches by $4\frac{3}{4}$, in
which a circle has been made towards one end, to
slip over the draw-tube. When in position (see
fig. 2¹), the unoccupied eye can remain open, and
much comfort, with no fatigue of vision will thus be
assured. The dark back-ground renders the image,
through the microscope lens, free from all extraneous
objects lying on the table top. Both eyes remain
open, one being, of course, used for viewing the
object.

The room for work should be well lighted, and *Apparatus*
should contain a firm table and cupboard. *required.*

Appended is a list of instruments suggested by *Mr. J. Mans-*
the Histology Demonstrator (Mr. J. Mansbridge), at *bridge's List.*
Guy's Hospital Dental School. and used by the
students in that Institution:

A COMPOUND MICROSCOPE.—NOTE.—The instru-
ment should have a firm stand, and be fitted with
rack and pinion, coarse and fine adjustments, and an
"Indicator."

The OBJECTIVES should be well "corrected,"
and have good penetrating power, with flatness of
field.

A double NOSE-PIECE.

PINE-WOOD box to hold six dozen slides, lying
flat.

Six dozen or more GLASS SLIPS, 3×1 inch,
ground edges.

Half-ounce thin COVER GLASSES, $\frac{3}{4}$ -inch diameter,
circular.

One-eighth ounce thin COVER GLASSES, $1\frac{1}{4} \times \frac{3}{4}$
inch, oval or oblong.

FORCEPS and needles, set in handles.
 Camels' hair BRUSHES, 2 large and 2 small.
 Small pair of SCISSORS, 2 section lifters.
 Three sizes glass CAPSULES, with glass lids.
 Small glass FUNNEL and filter papers.
 Half-dozen deep WATCH GLASSES.
 HOT TABLE, 6 in. high, the top 4 in. square.
 Small SPIRIT LAMP, to go under same.
 Half-dozen CLIPS.
 An Arkansas and an oil STONE.
 One box of neat square LABELS.
 A silk HANDKERCHIEF.

*Additions to
List.*

The above are those instruments generally used in class work. In addition, may be mentioned for private use :—

A good microscope LAMP.

An ether freezing MICROTOME.

Two or three large STONE JARS, corked.

Stoppered glass BOTTLES of 2 oz., 4 oz., and 8 oz. capacities.

A RACK containing half-a-dozen Wolrab gold cylinder bottles (fig. 3).



Fig. 3.

RACK FOR HOLDING BOTTLES.
 CONTAINING SPECIMENS, &c.

A small glass PIPETTE, fitted with india-rubber suction tube.

Glass MEASURE, divided into cubic-centimetres.

Two section LIFTERS, one large and one small, made of aluminium or bone (for using with acid solutions).

A TURN-TABLE for "ringing" slides.

Small dissecting FORCEPS and SCALPEL.

The slides should be as thin and flat as possible, have rounded edges, and be free from scratches.

The cover-glasses should be the thinnest (.04) procurable. Circles are more useful than squares, except in a few cases, because they are easily "rung" after the section has been mounted. They should be kept in cotton wool in a small box, and wiped carefully with a silk handkerchief, flat on the table, or between the fingers. Some workers prefer to keep them in a jar of water acidulated with nitric acid. The objectives and eye-pieces should always be cleaned by means of a small piece of soft wash-leather, both before and after using, and the microscope kept, when not wanted, under a glass shade.

About Cover Glasses.

The nose-piece is a useful addition to the microscope. It is better for the student to purchase one made of aluminium rather than brass. For, after some years, it will be found that the fine adjustment gets a little out of order, in consequence of the extra weight on the body and draw-tube of the instrument.

To those students, who are quite beginners and have never handled a microscope, the following remarks may be of service:—

Method of using the Microscope.

The instrument having been placed on a firm table, near a window facing N. or W. in the morning, S. or E., in the afternoon, out of the rays of direct sunlight, it should be tilted to a convenient angle, the student being seated. The 1-inch objective, and "A" or No. 1 ocular in place, and

The Question of Light.

the specimen fixed firmly on the stage by means of the clips. the plane mirror is now to be moved, in such a manner, that a flood of light passes through the aperture of the stage, and illuminates, equally, in all parts, the section to be examined. It is advisable to make sure of this by looking at the stage and section, not through the microscope tube at all, but at the side of the instrument. No diaphragm is to be used for the low powers. The coarse adjustment must now be carefully screwed up or down, as the case may be, until the specimen is seen to be in focus. If this has been done, as just described, the field of vision will be equally bright and clear, and the image sharp, but reversed. Every part of the section should be examined, by moving the slide about, using for this purpose the fingers of both hands to steady it. With Beck's 1-inch objective and "A" ocular, thus, the magnification—an important point in histological work—will be about 35; and, if "C" ocular is substituted for the lower power, the magnification equals 90 diameters.

*Examination
of Specimen.*

*To get a higher
Magnification*

If it is the wish of the observer to examine more minutely any particular part of the section, he should place that in the centre of the field. The $\frac{1}{6}$ -inch objective is then moved or screwed into position, after having first screwed up the coarse adjustment as far as possible, to prevent all risk of breaking the cover-glass or damaging the lens. If "A" ocular is used, and the plane changed for the concave mirror (care being again taken to equally illuminate the field of vision by means of the condenser and a small diaphragm), the coarse adjustment should bring the objective close to, but not touching the cover-glass, the fine adjustment being finally used for focussing. The magnification is now nearly 200. When "A" ocular is removed and "C" takes its place, the magnification

exceeds 510. To get a still higher magnification, the draw-tube of the microscope may be extended one, two or three inches. If it is thus lengthened, the section will be magnified 750 times.

The student, however, should be satisfied with using only, for many weeks, the low power objective and eye-piece. Later on, he can combine them with the higher powers, and produce the various magnifications obtainable. That the employment of low powers for ordinary work is the best, may be well conceived, when it is remembered that a clear steady illumination is produced by simple means, that the precision of the focal adjustment is not of the greatest consequence, and that the tendency towards errors of refraction of light is considerably lessened. A large field of vision is presented, and the position that cells and other structures occupy, with regard to the surrounding tissues, their relative size and number, and general characteristics are all best observed under a low amplification. *Choice of Powers.*

With high powers, the minute anatomy of the tissues—the markings of cells, structure of their walls, etc.—is brought out; but, *per contra*, the object is less defined, the illumination considerably reduced, and there is greater fear of spherical and chromatic aberration, leading to distortion and a false appearance of the image. *Low Powers.*

It will be some time before the beginner can manipulate the sub-stage condenser in a satisfactory manner. It is unnecessary to add a long account of it, experience in its use, as throughout microscopy, is by far the best instructor. *High Powers*

The above is the plan for viewing transparent objects by daylight or lamplight, opaque specimens being seldom, if ever, used in dental work.

The student having by this time become well acquainted with the various parts of the microscope, *Preliminary Exercise.*

their functions and movements, should proceed to follow the good advice given by Schäfer in his "Essentials of Histology." He should make temporary slides of the common objects of his room, *e.g.*, dust, fibres of cotton, silk, etc., and also mount a few air-bubbles. By so doing, he will be spared much trouble, annoyance, and loss of time. But the golden rule in Practical Microscopy, is to thoroughly learn to use the low powers, before work with $\frac{1}{8}$ or $\frac{1}{2}$ inch objectives is attempted.

*Practical
Examples.*

As before mentioned, each chapter will contain the methods of preparing sections of histological specimens. If the instructions, there given, are carefully followed, the student will, by using the objectives and oculars indicated, and by comparing the sections he has made, be enabled to see, on the stage of his own microscope, images almost identical with those, figured on the plates.

Thus, a human tooth having been prepared, according to the plans detailed in the following chapter, is mounted and examined with $\frac{1}{8}$ in. objective and "A" eye-piece. The student will observe, through his own instrument, appearances similar to those found in Plate I, Fig. 1. He should compare the drawing with the actual preparation, and, although the former will generally be somewhat diagrammatic—for the sake of clearness—he will soon be able to readily recognize the most prominent features of his own slide. In connection with each figure, the methods of preparation, the stain, and the magnifying powers used, will be mentioned, and the salient histological structure of the section brought out.

(To be continued.)

THE GENERAL MEDICAL COUNCIL.

SPECIAL FULL REPORT OF DENTAL BUSINESS.

THE Summer Session of the General Medical Council opened on Tuesday, the 22nd, at the offices of the Council, Oxford Street, London. There was a large attendance of members from the three divisions of the Kingdom. As usual, the Session opened with an address from the President, Sir RICHARD QUAIN. It contained the following references to dental questions:—

Several questions connected with dental business will require the attention of the Council.

The Education Committee will present a report on the subject of Dental Apprenticeship as a portion of the curriculum, which has been given up by the Royal College of Surgeons in Ireland, a course which is not in accordance with the practice of the other Royal Colleges nor with the opinion of the Dental Profession.

Other dental business will be the consideration of the communications from the Home Office in regard to a petition from Her Majesty presented by Mr. T. F. Tracey—a person with whom many members of the Council and its Officers are already familiar through his troublesome and offensive correspondence—and the answers thereto which have been sent in accordance with the advice of Counsel.

Mr. H. F. PARTRIDGE, with whom we have been so continually engaged in litigation, appeals for merciful consideration of his position. His statement of the reason of his erasure from the *Dentists' Register* is not, however, correct, as he was not deprived of his qualification by the Royal College of Surgeons in Ireland for advertising, but for having broken his pledge to the College not to do so. It would seem that the proper course for him would be to appeal to the College to restore his qualification.

A Memorial has been received from the British Dental Association, suggesting the advantages which would result from a dentist familiar with the necessities of his profession being a member of the Council.

WEDNESDAY, MAY 23RD.

At the meeting of the Council on Wednesday, the following communication from the British Dental Association was read and ordered to be entered in the minutes:—

“40, Leicester Square,

“London, W.C., May 21st, 1894.

“SIR,—The *Dentists' Act* was passed in 1878, and its administration was entrusted to the General Council of Medical Education.

“In the course of events many questions have arisen which, in the opinion of your memorialists, might have been considered with economy of time, and by a simpler process, if a dentist familiar with the necessities of his profession had been a member of the General Medical Council.

“We therefore beg respectfully to point out to you that there are now many dentists holding full Medical and Surgical Qualifications (some with University Degrees), and that certain of them are familiar with the varied phases of the questions which come before the Medical Council in the administration of the *Medical and Dentists' Acts*, so that by virtue of their general Medical Qualifications they would be fully competent to take part in the general business of the Council, whilst, as practising dentists, they would be capable of advising the Council in reference to dental matters.

“Not wishing to add to the mass of dental business now before the Council, we beg to recommend the suggestion of one or more *Dental Representatives* being added to the Council for your favourable consideration, leaving the matter entirely in your hands to take what course you may deem best, without seeking to embarrass you by asking for any definite pledge.

“On behalf of the British Dental Association,

“We have the honour to be

“Your obedient servants,

“*President*—CHARLES S. TOMES.

“*Pres. Representative Board*—S. J. HUTCHINSON.

“*Hon. Secretary*—W. B. PATERSON.

“*Vice-President*—JAS. SMITH TURNER.

“*Treasurer*—W. H. WOODRUFF.

“*To the President of the*

“General Medical Council of Great Britain.”

THURSDAY, MAY 24TH.

When the minutes came to be dealt with at the commencement of the sitting on Thursday,

Sir WILLIAM TURNER, Edinburgh, said he thought it would be satisfactory that the President should tell the Council what was the nature of the reply he intended to make to Mr. Tomes and those associated with him. This was a letter of great importance, asking the Council practically to agree that one or more dentists should be brought on to the Council.

The PRESIDENT replied that his answer to Mr. Tomes would be to the effect that the communication had been placed on the minutes and that the Council had taken no further action in the matter. Unless some action were taken by a member of the Council, that was the only reply that could be given.

Sir WILLIAM TURNER repeated that the Council ought to know something of the reply, because it was an important communication, and the request of Mr. Tomes and his friends could only be carried out by legislation.

The PRESIDENT said it was open to any member of the Council to raise the subject. Perhaps Sir William Turner would move in the matter.

Sir WILLIAM TURNER said he had no resolution.

The PRESIDENT again assured the Council that any member might open the question. Perhaps, he added, it would have been well had the dentists communicated with some member of the Council.

The matter then dropped and the Council proceeded with other business.

FRIDAY, MAY 25TH.

DENTAL REGISTRATION FUND.

In the Report of the Finance Committee of the General Medical Council, presented to that body to-day, there appeared a copy of returns to both Houses of Parliament of receipts and expenditure of the Dental Registration Fund of the Council for the year ending 31st December last. They showed a balance in hand at the beginning of 1893 of £7,779 11s. 11d.; receipts from Registration fees, £372 15s.; for sale of publications £26 19s. 6d.; and from dividends £214, making a total of the receipts £8,393 7s. 3d. The Expenditure was £50 for General Councils' fees and other expenses;

£23 5s. 1d. for printing; £460 1s. 7d. for salaries, house expenses, &c.; £295 3s. 6d. for law expenses; £3 15s. for auditors' fees. The balance at the end of the year, less £342 4s. 10d. due to the General Council, was £7,561 2s. 1d. The increase on the expenditure, as compared with the previous year was chiefly due to an increase of £178 17s. 7d. in law expenses.

DENTAL COMMITTEE.

The following were appointed the Dental Committee of the Council under Clause 5 of the Act of 1878 for the purpose of erasure from and restoration to the Dentists' Register:—The President (*ex officio*), Sir Dyce Duckworth, Sir W. Turner, Mr. Wheelhouse, and Sir Philip Smyly.

SATURDAY, MAY 26TH.

THE ROYAL COLLEGE OF SURGEONS IN IRELAND, AND THE DENTAL CURRICULUM.

At the Meeting of the General Medical Council to-day,

Dr. TUKE, Chairman of the Education Committee, introduced the report of that Committee on the subject of the abolition in the curriculum for the license in dentistry granted by the Royal College of Surgeons in Ireland, of the requirement of a three years' pupilage in Dental Mechanics. The report stated that in the regulations for the license in dentistry approved of, the Council of this College, on August 8th, 1884, evidence was demanded "of having been engaged in acquiring a practical knowledge of Mechanical Dentistry, for at least two years, in a public laboratory, recognised by the College; or for at least three years under the instruction of a registered dentist. The candidate shall also submit a piece of mechanical work, certified to be of his own making." The Committee had reasons for believing that this regulation was never carried into effect. The necessity for insisting on the production of evidence of having undergone a course of instruction in mechanical work by those proposing to practice Dentistry, appeared to the Committee so obvious that they did not consider it necessary to argue the point. It was impossible to test by any system of examination the possession on the part of the candidates of a knowledge of the manipulative processes which form the greater proportion of the work of a dentist. This could only be acquired by actual practice in the workroom. The other licensing bodies had adopted and maintained the Recommendation of the Council, and

it was manifestly unfair that candidates for any one license should be exempted from it. By section 23 of the Dentists' Act 1878 (41 & 42 Vict. cap. XXXIII.) it was enacted:—"Where it appears to the General Council that the course of study and examinations to be gone through in order to obtain such certificate as in this Act mentioned from any of the said colleges or bodies were not such as to secure the possession by persons obtaining such certificate of the requisite knowledge and skill for the efficient practice of Dentistry or Dental Surgery, the General Council might represent the same to Her Majesty's Privy Council." The Committee was of opinion that, in consequence of the Royal College of Surgeons in Ireland not requiring from candidates evidence that they had received instructions in mechanical dentistry during three years from a registered dental practitioner, the course of study prescribed by the said college was not such as to secure the possession by persons obtaining the license of that college of the requisite knowledge and skill for the efficient practice of dentistry or dental surgery; and they recommend to the Council to represent this opinion to the Privy Council; and to request the Privy Council to make order that the certificates granted under their present regulations by the Royal College of Surgeons in Ireland shall not confer the right to be registered under the Dentists' Act. The Committee were further of opinion that candidates for the said License, who hold a diploma in surgery, and who, by the regulations of said College, "are only required to produce certificates of one year's attendance at a dental hospital, where such attendance has been subsequent to the date of Diploma" should not be admitted to the examination of the license. The Committee were of opinion that the time has come for putting into force the powers conferred by Section 22 of the Dentists' Act for the visitation and inspection of the examinations held by the bodies conferring dental qualifications.

Dr. TUKE concluded by moving the first recommendation of the Committee as follows:—"That the Council intimate to the Royal College of Surgeons in Ireland, that unless the prescribed course of study for its License in Dentistry be amended so as to bring it into compliance with the requirements of the Council, prior to the next Examination for said License, the Council will feel it to be their duty to report to the Privy Council, in accordance with Section 23 of the Dentists' Act 1878, "That it appears to the General Council

that the course of study to be gone through in order to obtain the License in Dentistry of the Royal College of Surgeons in Ireland is not such as to secure the possession by persons obtaining such Certificate of the requisite knowledge and skill for the efficient practice of Dentistry or Dental Surgery"; and further, to request the Privy Council to make order that the certificates granted under their present regulations by the Royal College of Surgeons in Ireland shall not confer the right to be registered under the Dentists' Act.

Dr. MACALISTER said that in seconding the recommendation he should like to call attention to the fact that the Dental Curriculum had been accepted by all the licensing authorities of this country, loyally and continuously since it was first proposed in form, and also by the Royal College of Surgeons in Ireland until a very recent date. Without referring to the Council, upon their own authority they proceeded to leave out what was regarded by the Dental authorities as an essential part of their curriculum. The Dental practitioners throughout the country generally regard this departure by the Royal College of Surgeons in Ireland, as one of the greatest importance. The Committee had before them a strong memorial from the British Dental Association, and petitions from the Dental Hospital of London, the Glasgow Dental Hospital, the Victoria Dental Hospital, the Liverpool Dental Hospital, the Edinburgh Dental Hospital, the National Dental Hospital and College, urging the Council to take action to compel the Royal College of Surgeons in Ireland, to restore the requirements as to an apprenticeship in Mechanical Dentistry to the regulations for its Dental Diploma. These memorials would show that one was justified in saying that the dental profession at large in Great Britain were strongly opposed to this arbitrary curtailment of the curriculum. But a considerable number of those in the profession in Ireland itself were of opinion that this was a false step on the part of the Royal College of Surgeons in that country, and they were anxious that the strong representations on this side of the Channel should be supported, and that the college should perceive that a strict adherence to the curriculum would be for the benefit of the profession. He said that they, as a Council, should maintain those who were struggling for that curriculum. The Dental Act really gave the Council greater powers than even the Medical Act, and in recommending that the Royal College of Surgeons in Ireland should

be given another opportunity they were doing all that could be required on the subject to give them a *locus penitentiæ*. On a former occasion the Council had to do the same thing with regard to their curriculum as to the medical examination, and he was glad to say that the appeal to their better feelings had been successful, and that they had restored some Latin subjects to that curriculum. He did not think it would be necessary to go to the Privy Council on the subject, but he thought they must make reference to that here, and say, that if no change was made then the only alternative open to the Council must be taken.

Sir PHILIP SMYLY said a meeting of the Council of the College was held upon this subject in March. He was ill at the time, and was not able to attend, but the president of the college called on him after the meeting, and said that the college, as a college, were determined to carry out the views of this Council in the fullest way, and would cancel their order withdrawing the three years' mechanical study. He had it on the authority of the president that the views of the Council would be carried out to the fullest, by the Royal College of Surgeons in Ireland. He thought the resolution as framed, contained a threat, and he moved the omission of these words, as they were conforming without a threat.

Dr. HAUGHTON said that as a member of the Educational Committee, he did not think it necessary, after hearing what had fallen from the representative of the Royal College of Surgeons in Ireland to press this motion.

Dr. TUKE feared it was necessary to press the motion. Sir Philip Smyly had told them he had received the assurance of the president of the college, but that was not sufficient.

Mr. BRUDENELL CARTER pointed out that this was in no sense a threat, but merely a description of what the Council would feel it its duty to do.

Mr. MACALISTER said they were informed that the council of the college was not of one mind on the subject. Some were in favour of doing what was suggested and the committee desired to strengthen their hands.

After some conversation.

Sir PHILIP SMYLY said he had got hold of the draft recommendation which differed from that now before the Council. His attention

had been drawn to the words in it "*will feel* it their duty," and he would not now move an amendment.

The motion was agreed to.

Dr. TUKE then moved the second recommendation of the Committee :—"That, in order that the Council may be assured that the requirement especially dealt with in this Report, and other requirements, are being fully complied with, they shall, in accordance with Section 22 of the Dentists' Act 1878, appoint an inspector or inspectors, whose duty it shall be to visit and report on the examinations conducted by the bodies granting qualifications in dentistry, with special instructions to examine the schedules and certificates presented by every candidate ; and that it be remitted to the Executive Committee to consider the best way of carrying out the inspection."

Sir WILLIAM TURNER suggested that there would be a difficulty as regards finance in carrying out the inspection.

Dr. BRUCE said they might go to the Dental fund. It was very desirable that the inspection should be made.

Sir DYCE DUCKWORTH as Chairman of the Finance Committee said there was no money to come out of the Dental fund for an inspection.

The motion was agreed to.

Dr. C. TUKE then submitted the following "remarks " by the Committee.

"The Committee find that the Council's regulations in respect of dental qualifications are scattered through Vols. XVI., XVIII. and XVIII. of the Minutes, and they have had some difficulty in collating them. They beg leave to suggest that the Council instruct the Education Committee to codify the existing Regulations of the Council applicable to dental qualifications, and to report thereon to the Council."

The Council assented to the suggestion.

ADVERTISING BY DENTISTS.

The next business was to hear Counsel's opinion in regard to the following resolution considered on December 5, 1893, obtained by the Executive Committee pursuant to the resolution of the General Council, and by them directed to be read to the Council:—"The attention of the Council having been called to the practice of advertising as pursued by certain Dentists, it is hereby declared

that, while the Council will not at present interfere with this practice so long as it is confined to a mere notification of the place of abode and the profession of the advertiser, yet that the publication of a scale of charges, or the issue of advertisements containing claims of superiority over other Practitioners, or unfair depreciation of them, will be regarded as an offence with which the Council will be prepared to deal, and which may easily be carried so far as to constitute infamous or disgraceful conduct in a professional respect."

Mr. MUIR MACKENZIE, Q.C., the Legal Assessor suggested that the resolution should take the following form:—"The attention of the Council having been called to the practice of advertising as pursued by certain Dentists, it is hereby pointed out that the issue of advertisements containing claims of superiority over Practitioners, or unfair depreciation of them, may easily be carried so far as to constitute infamous or disgraceful conduct in a professional respect."

Mr. CARTER said he would bring forward a new resolution on Monday.

MONDAY, MAY 28TH.

DENTAL REPRESENTATION ON THE COUNCIL.

Sir W. TURNER moved:—"That with regard to the communication from the British Dental Association, in which it is suggested that one or more dental representatives be added to the Council, the Council is not prepared to adopt this suggestion." He said the gentleman moving in the matter appeared to rely upon Sub-section B of Section 10 of the Medical Act, which was as follows:—"that it is expedient to confer on any constituent body for the time being returning a member to the General Council collectively with any other body or bodies, and being in the opinion of the General Council of sufficient importance to be worthy of such a privilege, the power of returning a member of the Council separately." His reading of the Act which entirely different from the interpretation put upon it by these gentlemen. He always read it as meaning that any one of the medical authorities, being one of the bodies returning a member to the General Council could get a second member, or that in combination with other bodies, a second member could be got. He understood the contention of the gentleman moving in the direction of special medical representation to be that they were a constituent body or bodies to return a member. That seemed to him to be such a strained interpretation of the Act that it could not be considered for a

moment. He thought the original form in which the motion was drafted was the proper form, namely, that if a dental representative or representatives were to be added to the Council, it could only be through Act of Parliament. Still, in order that the motion might cover the whole question, and might include this section of the Medical Act which these gentleman had specially referred to, it was ultimately adopted by Mr. Wheelhouse and himself in its present form.

Mr. WHEELHOUSE seconded.

Mr. CARTER agreed that Sub-section B had no reference to the question, but it seemed to him that it would be more courteous to say that the Council replied to the association that it had no power to adopt the suggestion ;—that the matter so far as the Council was concerned was altogether *ultra vires*. Any dental practitioner having a medical qualification could be appointed a Crown member. He suggested as an amendment that the last clause of the motion should read :—"the Council replies that it has no power to adopt the suggestion."

Sir W. FOSTER urged that Mr. Carter's suggestion should be adopted, otherwise he must oppose the resolution as it stood. He did not think the Council had any power, under the clause referred to, to give them such a representative as they asked, but he should be sorry to send a curt answer like this.

Sir JOHN SIMON did not see why dentists had a better claim to special representation than surgeons generally. Why should a distinct place be given to a dental practitioner any more than to an intra-uterine practitioner ?

Dr. HERON WATSON did not think a member should be elected to sit at the board when matters were discussed which were beyond his comprehension.

The PRESIDENT mentioned that he had received a letter from Mr. Hutchinson, a dental practitioner, on the subject. He founded his claim on the fact that in Scotland there was a representative for every 706 registered practitioners, and in Ireland a representative for every 653 registered practitioners. Then he said : "Here are the dentists who number 1,277 and hold the diploma from the Royal Colleges and they had no representative." He also said that under Section 10 of the Medical Act, the General Council had the power.

THE DENTAL RECORD.

Sir W. TURNER said he had no wish to be discourteous. 71. motion was simply a statement of what he thought the position the Council should take up. If legally they could not do what they were asked to do, they should state it so as to put it on a ground that would at once show these gentlemen that if they wanted to be represented, they must get the law altered. If the Council was of opinion that the view of the law taken by him was correct, he was willing to add to the resolution the words:—"and believes that it has no legal power in the matter."

Sir W. FOSTER thought the last clause of the resolution as it stood on the paper should be omitted, as it was undesirable that the Council should appear to be in opposition to the claim. He would much prefer that there was a dental representative with them who would take care of the interests of his branch. He thought that was a fair claim that would have to be conceded some day, and he had no desire to put himself in opposition to a claim which he considered essentially based on justice.

Sir JOHN SIMON contended that to specially introduce dentists would lead to the introduction of a host of other practitioners.

Dr. GLOVER agreed with Sir W. Foster that the resolution should be so framed as not to commit the Council to any opinion, especially any hostile opinion, as regards the claims and rights of the dentists.

The resolution as amended by substituting for the last clause the words:—"the Council believes that it has no legal power to adopt this suggestion," was then agreed to.

ADVERTISING BY DENTISTS.

The Council then proceeded to consider a motion on this subject standing in the name of Mr. Carter, the terms of which, as suggested by Mr. Muir Mackenzie, Q.C., appear in Saturday's proceedings.

Mr. CARTER said he had received a brief communication from Sir John Simon, which placed him in the position which a former Master of the Trinity once occupied, when he commenced a sermon by saying, "St. Paul said, and I partly agree with him." Sir John Simon was kind enough to suggest a little alteration in the wording of the resolution, with which for the most part, he agreed. But it would be in the recollection of the Council that Mr. Muir Mackenzie improved on his original resolution, because he said it was calculated to commit the Council beforehand to a course of action, so that if

they only stood clear of committing the Council, he thought they should be safe. He would read the motion in this way :—"That the attention of the Council having been called to the practice of advertising by certain dentists, it is hereby resolved that the issue of advertisements of an objectionable character, and especially of such as contain either claims of superiority over other practitioners, or depreciation of them, may easily be carried so far as to constitute infamous or disgraceful conduct in a professional aspect.

Sir DYCE DUCKWORTH seconded.

In reply to Sir Wm. Turner, he said it was his intention to include in the term "advertisements," huge placards and other notices posted in front of a house, but that was a question for the Council.

Sir W. TURNER said it was a question how far such a notice in front of a house could be regarded as an advertisement or a mere notice of a place of business.

Mr. CARTER said he intended, after this resolution was accepted, to move, "That certain placards or advertisements (alluding to photographs of house-front notices, black letter and coloured picture placards, displayed on one of the walls of the Council room) and some others be referred to the Committee on Penal Cases to consider, whether they constituted any case against anybody.

Sir W. TURNER—Would you call the announcement of a chemist and druggist an advertisement? Isn't it an announcement of the trade, or occupation of the trade carried on by the person within?

Mr. CARTER—I should call it both.

Mr. MACALISTER—"Advertisement" is applicable to a medical practitioner, and I think it is the widest word you could possibly use.

The motion as amended by Mr. Carter was then agreed to.

*It was further agreed on the motion of Mr. Carter—"That the foregoing resolution be communicated to the Medical and Dental Journals, and to the authorities of the recognised Schools of Dentistry."

Mr. CARTER then moved the reference to the Committee on Penal Cases of certain placards or advertisements, of which he had just given notice.

§ Mr. MACALISTER seconded, but the feeling of the Council appeared to be against this procedure, and the motion was negatived.

* See Letter on p. 292

REPORTS OF SOCIETIES.

THE ODONTOLOGICAL SOCIETY OF GREAT BRITAIN.

THE Ordinary Monthly Meeting of the above Society was held at 40, Leicester Square, on the 7th ult., the President (Mr. F. CANTON) in the Chair. The minutes of the previous meeting were read and confirmed.

The PRESIDENT announced that Mr. Rhys Price and Mr. Aubrey Farebrother had been duly elected members of the Society.

The LIBRARIAN (Mr. W. A. Maggs) stated that the third edition of Dr. Evan's "Crown and Bridge Work" had been acquired by purchase. The Official Year-Book of the Learned and Scientific Societies had also been received, and he might mention that the Council of the Royal Medical and Chirurgical Society had expressed their willingness to exchange their Transactions with the Odontological Society.

The CURATOR (Mr. Storer Bennett) acknowledged specimens presented to the museum by Mr. E. Lloyd Williams and Mr. Oswald Fergus. The model given by Mr. E. Lloyd Williams was extremely interesting, showing two lower bicuspid, one of which (the left one) was inordinately large. Unfortunately, no excuse presented itself for extraction, otherwise that would have seemed a desirable course. Mr. Oswald Fergus had been good enough to present a lower molar with a large crown and disproportionately short and slender roots. He had also sent a right lower molar, on the extraction of which showed the roots to be united by exostosis, another molar, removed on account of necrosis and absorption of the alveolus, having two buccal roots, and lastly, one with inordinately large roots.

Mr. S. J. HUTCHINSON mentioned that Mr. James F. Rymer, of Brighton, had forwarded to him for presentation to the museum, an extremely interesting photograph of a patient, showing very greatly enlarged central incisors, which he had extracted; he also sent the two teeth. He thought that members would agree that Mr. Rymer's course of treatment was the correct one. Having first removed the two teeth, he was also careful to remove as much as possible of the anterior alveolar plate, so as to reduce as far as could be done, the deformity caused by the prominence of the incisors. The interesting feature connected with the case was, the excessive size of the incisors,

which Mr. Hutchinson attributed to the gemination of a supernumerary tooth with an ordinary central. He had not yet made a section of the teeth, and would not like to do so without Mr. Rymer's permission, but there seemed to him to be a very obvious line of demarcation pointing to gemination; that would not account for the excessive length of the tooth, but it would account very satisfactorily for the excessive width. There was a very light portion and two dark portions, and he thought that a section through the root of one of the teeth would show either two distinct nerve canals or else a dumb-bell shaped cavity; if that were done, it would set the matter at rest. He had never himself seen such very large permanent incisors before, and thought that the Society was much indebted to Mr. Rymer for them.

Mr. Hutchinson also exhibited a Dental Reflecting Lamp. It moved vertically on an upright, gave a very diffused light, and cast no shadow of the filament.

Mr. J. BLAND SUTTON exhibited a rather large example of what was often called a "root cyst," but which he preferred to describe as a "pus cyst." It was attached to a six-year-old molar, which had been removed from a lad aged 14. When the patient came under observation, all the characteristics of abscess at the fang of the tooth presented themselves. The crown was almost destroyed by caries, and the pulp cavity was widely exposed. When the tooth was extracted, a cyst the size of a pigeon's egg was found attached to it; when the cyst was opened a large quantity of pus escaped. Of course, these pus cysts were very well known to dental surgeons, but it was, at any rate, the largest he had ever seen, and he thought it worth bringing to the notice of the Society.

Mr. OSWALD FERGUS exhibited and explained an apparatus which he had devised, and to which he had given the name of "The Dental Phantom." The object of it was to aid students in acquiring practical skill in dental operations prior to their undertaking the treatment of patients, and also to facilitate the work of teachers. As he had said elsewhere, it was expected, and rightly expected, that students should not be let loose to work their will on their suffering fellow creatures without first having acquired a proper efficiency. Mr. Fergus thought that the methods hitherto adopted in teaching were deficient, inasmuch as they did

not supply the students with the surroundings which would be found in actually treating a patient. The apparatus consisted of three parts, an upright, and on this upright could be placed a representation of the upper and lower jaws in brass, each of which were fitted with a gutter, and into the gutter the teeth were placed. He would suggest that if the operation of extraction was to be demonstrated to a student, the material might be stent, or some similar composition; for fillings, ordinary plaster of Paris would be on the whole preferable. Almost any operation on the human mouth might be demonstrated with the appliance. There was, in addition, an elastic band which went round both jaws, forming an artificial cheek, so that the student had to deal with conditions very closely resembling those that would be met with in actual life.

Mr. STORER BENNETT eulogized the device, and specially pointed out the advantage it afforded of enabling the student to work on the upper jaw without holding the specimen upside down, thus giving him the opportunity of learning how to use the mirror, which hitherto he had not been able to do until dealing with actual patients.

The SECRETARY read a letter from Mr. W. Cass Grayston, of Scarborough, with respect to an accident which occurred in the removal of a second upper molar; the tooth stood alone, all the other teeth having been removed. An ordinary upper molar forceps was employed, no more than the usual amount of force being used, but a very large portion of the bone came away with the tooth, including the tuberosity.

The PRESIDENT thought that it would be the general experience that where one got a tooth standing alone, the alveolus is very strongly adherent with it.

Mr. J. F. COLYER detailed particulars of, what he described, as a rather interesting case of swelling in the lower jaw on the left side: the patient, a boy aged 17, was in attendance. The situation of the swelling was from the base of the coronoid process as far upwards as the second bicuspid tooth. The outer alveolar plate was bulged more than the inner. On the inner side of the jaw low down a swelling could be felt with a very sharp margin of bone. The cyst, being punctured, emitted a quantity of fluid, which examination showed to contain a considerable amount of albumen, but there was no evidence of cholesterine. The growth first manifested itself eight

or nine months ago when a molar tooth came out, and three months later another molar also came out. Undoubtedly it was a cystic swelling of some kind or other, and Mr. Colyer was inclined to regard it as an epithelial odontome, the only point against that theory was that the patient was rather young.

Mr. GARTLEY exhibited several specimens, viz:—a lower central and two bicuspid encrusted to an enormous extent with tartar; a good specimen of ossification of the pulp, and a case of exostosis in a bicuspid. In the instance of the ossification, the tooth had been the cause of considerable trouble to the patient for a period of ten years, during which time it was frequently filled. When Mr. Gartley first saw the patient only a tiny cavity in the crown was observable, but she complained of what she termed "flashes of lightning" in her tooth. He then filled it, but after a time the pain reoccurred, notwithstanding this, however, until recently the patient opposed its removal. The tooth was split in the operation of extraction, and Mr. Gartley then discovered the ossification of the pulp.

Discussion on the "Retention of Artificial Dentures in Edentulous Lower Jaws."

Mr. DAVID HEPBURN ~~opened the discussion~~. Having remarked upon the advantage of occasionally displacing a paper by a discussion on some practical subject, he stated that in introducing the subject for which he had made himself responsible, he intended to confine himself to a consideration of those cases, which present themselves happily only from time to time, which gives much uneasiness to the patient and specially tax the ingenuity of the practitioner, cases which for want of a more elegant term he would call "slipping lowers." The difficulty then upon which they wished to throw light was that which revealed itself when a patient, probably advanced in years, seeks the aid of the dental practitioner with a view to being supplied with artificial teeth, all the natural ones being lost and not even the roots remaining. A denture is adapted, but as the early days of trial progress it is found that it has a tendency to slip forward, in consequence of which the mucous membrane becomes irritated, and more or less ulceration and pain is set up. These symptoms are relieved by "easing," as it is called, but only temporary relief results; shortly fresh spots of ulceration appear, and the operation of "easing" has to be repeated. What were the condition leading to such a result? It would be well to recall some of the simple

anatomical facts connected with the lower jaw which had a direct bearing on the subject. The inferior maxillary bone varies much at different periods of life. It consists of a curved horizontal portion and two perpendicular portions (the rami), which join the posterior portion of the body on either side. At birth the rami join the body at an oblique angle, as maturity advances, and up to middle life, the obliquity diminishes until the junction is rectangular, in extreme old age, or second childhood, obliquity is resumed, simulating the condition as presented at birth. It was this obliquity in a more exaggerated form which rendered the jaw intolerant of the artificial denture. Comparing the normal outline of the jaw in middle life with that typical of old age, he would draw attention to the position of the mental foramen, noticing it first from its external aspect. It would be observed to be midway between the superior surface of the alveolus and the base of the jaw in the first case, in the second, the alveolus having disappeared, it opened close to the superior surface of the body of the jaw, at which point its nerves and vessels spread out directly to the mucous membrane. Viewing laterally the internal surface of the inferior maxilla, the mylohyoid ridge would be seen to be directly midway between the superior surface of the alveolus and the base of the jaw. Again, a further point to be noticed on this aspect of the jaw was the group of genial tubercles situated on the inner side of the symphysis, when extreme absorption had taken place they often assumed an indefinite mass and form with their tendinous attachments, on which no denture can rest. An inclined plane is created laterally, and from this eminence a denture will often slip downward and forward. In addition to these immediate aspects of the body of the jaw itself there were conditions of mobility different from, or rather an exaggeration of, those which the joint is capable of performing during the period when the teeth are existent. As most bony prominences become modified with advancing years so it is with this one. Further, all these senile changes were frequently associated with alterations in the spinal column, resulting in a fixed downward and forward position being imparted to the head, causing the jaw to rest most naturally in a state of protrusion. By reason of this the space posteriorly is reduced to a minimum, therefore when the artificial teeth are present there is a tendency for the denture to be tilted and displaced. Affecting also lower dentures, they had the muscular force of the tongue. The points he had endeavoured to

emphasize might exist temporarily or permanently. With regard to treatment, provided that careful impressions of the part had been obtained, and the most natural antagonism ascertained, the question presented itself as to whether or not spiral springs should be employed. He would suggest that they should be dispensed with, as, by reason of the configuration of the lower jaw, they will tend to displace, rather than retain, the denture. At the same time he thought there existed certain classes of cases which needed the employment of springs where the retention of the denture by suction was impossible. When necessity arises for the fitting of springs certain points must be adhered to: in view of the limited space they must be brought well forward; further, it should be provided that when the jaw opens the lower swivel will be on a vertical line with the upper swivel, in this position they should be "blocked," *i.e.*, stops should be inserted in proximity to the swivel heads. By this means the direct thrust of the spring will be maintained. Deeply cut chambers will sometimes suffice to procure the same result. The consideration of the adjustment of springs would afford a theme in itself for discussion. Dental surgeons will receive eagerly any suggestion which would retain lower dentures in their place, and by the kindness of Mr. Lennox, of Cambridge, he (Mr. Hepburn) was able to show the contrivance which was fully described by Mr. Lennox at the Exeter meeting. The most heroic treatment was that suggested by Mr. Dall, of Glasgow, who created sockets in the lower jaw by drilling, into which he inserted posts, by means of which the denture is retained. Another method was that of weighting lower dentures to ensure stability, the principle, Mr. Hepburn thought, of the greatest service where the muscles were strong, but he had had a case where the muscular resistance was so great that the denture was like "a stormed tossed vessel in an angry sea." With regard to the relief of pain by lining the denture with gutta-percha, the mucous membrane became absolutely tolerant of it, but there was the disadvantage of impurity after prolonged use. The metal moulds required some ingenuity in their treatment. The perishable nature of the base, and the impossibility of paring it away without destroying its surface should laceration occur, detracted from its advantages, and all things considered, vulcanite seemed the best. In conclusion, he would give his own experience in a few words. He believed that the difficulties could

only be overcome by personal adjustment of the denture to the mouth itself through repeated trials, consequently, during the initial stages of "fitting," frequent visits at short intervals on the part of the patient were of the utmost importance. Having examined the patient, and formed a prognosis of the difficulties to be dealt with, impressions should be taken, preferably in plaster of Paris. When these were cast, and trial plates prepared, the approximate articulation should be taken, with the head bent slightly forward. The bite having been taken, the upper denture might be made and the lower one set up in wax, keeping the lower front teeth well within the upper teeth as to position and height; if springs were used they should be temporarily adjusted. Almost invariably the articulation, notwithstanding the precautions, would be found at fault—the lower would slip forward. He would then cover the crowns of the teeth with a moulding of pink wax while the wax was soft; taking the dentures out of the mouth, the two should then be united according to the indications thus obtained; the bite might then be finally adjusted. In doing this the teeth should again be set well back, and no prominent cusps be allowed to interfere with the free movement of the jaws. In the upper denture additional canines in the place of first bicuspid would allow of freer movement without tilting.

Mr. LAWRENCE READ said, with regard to the remarks of Mr. Hepburn as to the lining of the lower pieces, this was a matter in which he had taken some interest, and had devoted a good deal of time to some six or seven years ago; the difficulty of finishing the rubber he had now quite overcome, it was a very simple matter when once one knew how to deal with it. His method was to take a large piece of steel wire, about a quarter of an inch thick with a rounded end, make it red hot, and run it over any rough surface that it was desired to polish. If it was then treated with a little chloroform on wool a beautiful polished surface was left, just as if it had been baked in a metal mould. It took no time to do, and every edge could be finished off as nicely as could be desired. He had had some lowers with the soft rubber linings, which had been worn for seven years, and were still quite perfect in every way. It was not at all necessary to make them on metal moulds, and they could be finished off, if a little rough, just as readily as a piece of hard vulcanite could be polished.

Mr. S. A. COXON (Wisbech) demonstrated, by means of diagrams on the black-board, the plan he adopted in order to get the swivels for springs exactly opposite one another. His method was to take a small strip of No. 7 gold, fold another piece over it, pressing it tightly, thus forming a bolt which could be drawn either forward or backward, and permitted of the springs being put in absolutely true. Another advantage was that the swivel could be attached without getting twisted.

Mr. F. J. BENNETT, commenting on the model shown and explained by Mr. Hepburn as being in an oblique position an inclined plane being formed, thought that the condition would bear another interpretation. As it stood, undoubtedly there was an inclined plane, but he (Mr. Bennett) doubted whether in nature they ever got that condition of the mouth if left to itself. If artificial teeth were placed in the mouth it might be so, but without them there was no longer an inclined plane, the lower and upper jaws became parallel. He thought that these facts should teach them to make the bite as shallow as possible, in that way the inclined plane would be reduced to a minimum, Mr. Bennett then criticised at some length the anatomical accuracy of the diagrams by which Mr. Hepburn's opening was illustrated.

Mr. G. BRUNTON said there was a point which he had been expecting to hear mentioned, namely, that where springs were worn they not unfrequently twisted round, in consequence of which the upper denture is twisted in one direction and the lower in another. He might say that he personally very seldom used spiral springs, but he had seen such cases, and it occurred to him that the reason of the twisting was that the two spiral springs were both coiled in the same direction; he thought that if they were coiled in opposite directions the difficulty would be overcome.

The PRESIDENT remarked that he had himself seen cases similar to those alluded to by Mr. Brunton. They were usually cases where the denture had been worn for many years, and he was inclined to attribute the twisting to the absorption of the alveolus at the sides leaving the plate nearly impinging on the palate in the middle. He had never seen the twisting in freshly made plates.

Mr. W. A. VICE narrated an instance which had come under his notice only the previous week, and which supported the view just expressed by the President. The denture had been worn for a long

time, the lower arch was absorbed very much until the lower piece would not fit at all. The lady dated the movement round to the left side from the time of her having a new spring on the right, and Mr. Vice thought that she was probably correct ; there certainly was some difference in the strength of the springs, the old one on the left being much weaker than the new one on the opposite side.

Mr. S. J. HUTCHINSON said that Mr. Hepburn had spoken of the loose membrane which was sometimes the cause of trouble in fixing a lower denture. His usual plan was to snip off the membrane with a pair of scissors, allowing the wound to cicatrize, and in this way the difficulty was overcome most satisfactorily.

Mr. H. BALDWIN narrated particulars of a case in his own practice, presenting some very interesting features. It was an instance in which an artificial denture, fitted to an edentulous mouth, hurt the patient, not because it slipped forward but because it moved about so much. But little remained of the lower alveolar process. The attachments of genio-hyoglossus and mylohyoid muscles stood up from the general level of the lower jaw. It was an interesting point, Mr. Baldwin thought, that these muscles were preserved when there had been the greatest possible removal of the rest of the alveolar process. To make the plate more comfortable velum rubber was tried as a lining, but it had to be given up as the patient, a man aged sixty, found it induced a tendency to champ his jaws together. The greatest success in treating this case was ultimately obtained by setting up the teeth on a Bonwill articulator, paying great attention to the practical hints upon which Dr. Bonwill laid stress, that was to say, taking care to have the line of articulation of the two rows of back teeth bending decidedly upwards, and further, providing that in all possible movements of the lower jaw the lower denture would strike the upper one at *three points* at once. Considerable care and trouble was necessary in order that this requirement should be fulfilled, but it could be done.

Mr. W. A. MAGGS thought that perhaps Mr. Hepburn laid too much stress upon the mandible, personally he had always regarded the articulation as responsible for the forward movement. The fact that the *eminentia articularis* in aged skulls was so much diminished would tend of course to the free movement of the mandible. No doubt the articulation became very lax, and if it were possible to examine a sufficient number of skulls a considerable difference in

the neck of the condyle, and probably in the condyle itself, would be found. He thought that the cases just mentioned by Mr. Baldwin were probably aggravated by the continuous wearing of the denture. While it was difficult to do without the teeth, yet they knew that continuous pressure produced absorption, and he thought that if the denture were not so constantly worn the tendency to wasting of the jaw would be diminished.

Mr. J. H. BADCOCK said that in cases where one had great difficulty in making a lower remain in its place, a model taken in the ordinary gutta-percha or stent would show a ridge all round, if, however, a model of the same jaw were taken in plaster of Paris they would find no ridge; for this reason he strongly advocated plaster of Paris in preference to gutta-percha for taking impressions in such cases. If the model were taken so as to rest only on the floor of the mouth, and not at all upon the bulging sides, there would be very little difficulty, and there would also be much less trouble *afterwards* in easing the case away where necessary. With regard to smoothing the velum rubber with a hot iron, he thought the whole secret of success lay in having the iron hot enough.

Mr. R. H. WOODHOUSE did not think that the discussion ought to pass without an allusion to the extreme importance of preserving the natural teeth. They knew that the alveolus was so subservient to the presence of the natural teeth that the retention of even a single tooth, if prolonged, might save all the trouble that had been described that evening.

Mr. W. HERN desired to touch upon a point with regard to the muscular attachments referred to in the mylohyoid ridge. He thought it would be found a considerable advantage if the denture were left a little low. He agreed with Mr. Badcock as to the superiority of plaster models. There was a little point about the tray for taking impressions; if the tray was a little deep one got the fraenum of the tongue thrust down, giving a false impression. With regard to the turning of the dentures in opposite directions, as referred to by Mr. Brunton, he (Mr. Hern) thought that it was due to the thrust of the swivel being inaccurate, so long as the denture fitted well the plates were correct and retained their adaptation, but when the mouth began to change and the fitting was not quite so correct, then the upper and lower dentures turned round as the consequence of the thrust of the swivel being wrong. It seemed to

him that the excellent device brought forward by Mr. Coxon would correct this.

Mr. COXON had omitted to mention that if one got a slight soreness of the mouth it could be relieved by shifting one of the bolts a little. His contrivance also afforded an opportunity to the patient of seeing if he could do without springs.

Mr. BETTS stated that he found it very useful to ask a patient to protrude the tongue; by this means, in conjunction with a shallow tray, the floor of the mouth was raised and one got a much more satisfactory impression.

Mr. STORER BENNETT, after the exceedingly interesting and able manner in which Mr. Hepburn had introduced the subject, wished only to touch upon an anatomical point, to which allusion had been made in the opening. In going through the museum certain variations in the height to which the *eminencia articularis* was raised would be observed. He gathered that Mr. Hepburn was of opinion that a good deal of the forward movement of the lower jaw in old people was due to the fact that the *eminencia articularis* in them was much lower than in people of middle life. This view should not go forth on the authority of the Society without a reservation. He (Mr. Bennett) thought that the protrusion was probably due more to the fact of the ligaments yielding and the jaw becoming exceedingly lax in old age than to any absorption and flattening of the *eminencia articularis* itself.

The PRESIDENT having announced that the next meeting would be devoted to a discussion on the "Treatment of Carious Molars in Children," to be introduced by Mr. Owen, the usual votes of thanks were passed, and the meeting terminated.

THE American Dental Society of Europe will hold its 19th Meeting at Geneva, Switzerland, August 6th, 7th and 8th, 1894. Last year this annual gathering was omitted, as many members wished to attend the Columbian Dental Congress. Americans practising dentistry in Europe, who may wish to join the Society, should make written application to the Membership Committee of which Dr. J. H. Spaulding, 4, Rue de Rome, Paris, is Chairman, and will be personally present at the meeting. For further information, or for programmes, apply to Chas. W. Jenkins, Secretary, No. 1, Sonnenquai, Zurich.

THE DENTAL RECORD, LONDON: JUNE 1, 1894.

THE IMMEDIATE ROOT-FILLING CRAZE.

"NOTHING" it is said, "is done without enthusiasm," and, in the remark, there is a great deal of truth, yet enthusiasts are apt to be just a little too sweeping in their assertions, a little too ready to set forth, as a dogma, what is at best an unproved statement. They draw conclusions from limited experience. Statistics supply them, as they will everyone else, with the proofs they need, and fortified by these, they last, but by no means least, look on those, who differ from them, as ignorant, unskilled, foolish people doomed to oblivion, if not eternal damnation. Nevertheless, we owe these enthusiasts a great debt of gratitude, for though they may be at one extreme of the swing of the pendulum, yet it is they, who have set it in motion, and the position of rest will, doubtless, be in advance of that which it aforesaid held. It is scarcely needed to enumerate a list of points concerning which crazes have passed over the stage of dental practice. Crazes for a time, but pruned, modified, elaborated, they have taken their place, not ahead of and to the exclusion of other ideas and methods, but alongside these to be used in proper time and place. Nothing would prove our remarks better than the discussion on root-filling by the members of the Odontological Society, reported in our last issue. As is well known, the fashion of the day is to be an immediate root-filler. To be absolutely correct on this subject a man must be in a position to affirm, that he never dresses a tooth, fills them all at the first visit and never has a failure, or, if one should, by some mal-interposition of Providence, occur, it is due to an occult cause, and that this is of less potency, when brought beneath

the magic influence of this special treatment, than when any other is tried. For dead teeth there is one treatment:— Immediate filling, and one drug, peroxide of hydrogen.

Broadly speaking, dead teeth may exist in two conditions: in one the root membrane is healthy, in the other it is not. The extremes of either of these groups may be safely diagnosed, but those on the border land may give rise to difficulty and doubt. The first group indicates immediate filling, after clearing the pulp cavities. It is obvious, since beyond the apical foramen is simply healthy tissue, dressings, as far as this be concerned, would be injurious rather than otherwise. If the pulp cavities can be thoroughly cleansed, and for this copious syringing with water is as effectual as most other fluids, then dried and subsequently filled, micro-organisms, remaining in the tubuli, need be of little concern to us for we have abolished the conditions of their continued existence. Our second group of dead teeth form, however, the bone of contention over which we all love to have our little squabble. Seeing that dryness of pulp cavity, before filling, is one of the tenets of the immediate root-fillers' creed, certainly a discharging tooth cannot be filled unless such discharge can be stopped at the sitting. This, we beg leave to state, cannot be done, save by the spurious means of plugging the apical foramen with some extraneous matter. It would be as rational to expect the discharge coming from a carious joint to cease because the surface openings had been washed with some patent cure-all. Many, who rank themselves with immediate fillers, recognise this fully, and treat such teeth by drilling into them and leaving them so. Drainage, they undoubtedly obtain, and, if our existence were in an Utopia we could imagine such treatment perfect, unfortunately the vent, which forms the outlet, also forms the inlet, and to be logical, such a man should treat the above-mentioned carious joint in the same way, open it and leave it free to the winds of Heaven and the dirt of earth. We certainly have never been able to appreciate the ground of such action, nor the reason why we should be

called upon to abandon such dressings as common-sense and scientific teaching dictate.

Our question is, however, further complicated by, it not the majority, at any rate a great number of cases, in which there is no apparent discharge down the pulp cavity, but in which the root-membrane is obviously not healthy. Here, we would humbly suggest, the conditions of our work—would indicate the proper treatment, if the patient is coming, or can come again, it would be wiser to delay permanent work till then, if not, we must venture an immediate root-filling, honestly recognising the fact, however, that we throw ourselves on the mercy of mother Nature, who, when we have removed the apparent cause of the disease, kindly overlooks our errors, and in spite, not because of them, completes the cure. And if some speaker should ask us the conundrum:—"If on the second visit the tooth had been found healthy why would it not have been advisable to have filled it on the first?" We would heave a sigh, that the days of prophecy are passed, and mildly suggest, that, if people could have foreseen the awfully bad teeth they were destined to have, they would, with their tiny fingers, have squashed their embryonic tooth germs in utero, and have led a happy, if a toothless existence.

News and Notes.

SIR JAMES and Lady Paget celebrated their golden wedding on Wednesday, May 23rd.

THE *Lancet* says, "We understand that there is a probability of steps being taken to hold the annual meeting of the British Medical Association in 1895 in London."

MR. A. B. DENSHAM, M.R.C.S., L.D.S., has been appointed Demonstrator at the London School of Dental Surgery, Leicester Square

THE *Southern Dental Journal* says: "They believe all the States and Territories now have dental laws except Alaska, Idaho, Indian Territory, Montana, Nevada and Utah. These will necessarily soon follow suit in self-defence."

THE Dental Manufacturing Company have sent us one of their improved Hodge Right-angle Attachment. We still await the ideal Right-angle Handpiece, but in the meantime, this is a real step forwards, and quite overcomes the tendency of the bur to drop out.

ROYAL COLLEGE OF SURGEONS IN IRELAND.—Dental Examinations.—The following gentlemen having passed the necessary examinations have been admitted Licentiates in Dental Surgery of the College :—Sydney Aveline, Reading ; Richard Neller Kiddle, London ; Randolph Llewelyn Pollard, London ; Ebenezer Poock, London ; and Francis Owen Stoker, Dublin.

ACCORDING to *Inventions*, another new plan for soldering aluminium involves the use of phosphorised alloys for the purpose, the function of the phosphorus being to remove the thin film of oxide which is always present on the surface of aluminium, and renders soldering so very difficult. It is stated that good practical results have been attained by this process, which has been discovered by Mr. Joseph Richards, of Philadelphia, U.S.A.

THE Mississippi State Board of Examiners deserve our thanks. One of their members seems to have been the black sheep of the flock. He advertised, and broke the recognised code of ethics, and yet would not resign his post unless all the other members did likewise—neither would the governor remove him. The whole Board have, therefore resigned, and pledged themselves not to again accept office under the present Governor. Whose *official* life, we hope, may be a short one.

THE following gentlemen passed the First Examination for the Licence in Dental Surgery of the Royal College of Surgeons, Edinburgh :—David Alves, Montrose ; Charles Albert Lightfoot, Newcastle-on-Tyne ; Alexander Munro, Edinburgh ; John William Edward Stewart, Dundee ; Henry Alfred Coleman, Wrexham ;

Charles Wood, Carlisle ; Ralph Carr, Newcastle-on-Tyne ; Frederick Cornel Dopson, Liverpool ; William Edward Stewart, Dundee ; Thomas Alexander Mackintosh, Albert Leeming, and John Lewis, Shields. The following gentlemen passed the Final Examination and were admitted L.D.S., Edinburgh :—Robert Lindsay, Edinburgh ; John Kyle Mackintosh, Inverness ; David Robertson Campbell, Glasgow ; Alexander Young, Halifax ; Murray Forbes Thomson, Dublin ; Frederick Robert Guyler, Liverpool ; Joseph Morton, Carlisle ; and Malcolm James MacGregor, Edinburgh.

ALTON H THOMPSON, as reported in the *Dental Headlight*, says: "The fourth molar of complete form is sometimes found in the negro of the United States, and is well arranged in the arch. In the white races, however, it is nearly always a mere rudimentary peg, rarely or never being of typical form and well arranged in the jaw. A case is reported, however, in which there were four extra molars, one on each side of each jaw, in a white woman. (*Cosmos*, Vol. XIV., p. 227.) The reduction of the jaws in the higher races has contributed to its obliteration, and this contraction is now going on and is crowding out the third molar. The occasional reversion of the fourth molar is interesting, and cases where it presents in full form in the arch are of especial interest to the evolutionist as exhibiting a return to a condition that takes us back even of the higher apes, which have the same dental formula as man."

At the Congress of the Surgeons of Germany, a table of statistics dealing with anæsthetics was presented for the fourth year. 51,846 cases are recorded: 32,745 with chloroform ; 11,617 with ether ; 3,896 with chloroform and ether ; 760 with chloroform, ether and alcohol ; 2,769 with bromide of ethyl. The average of fatal accidents is 1 in 2,587, and for chloroform 1 in 1,924. In the four years, 163,493 cases are recorded and 61 deaths. The average being, with chloroform, 1 in 2,655 ; with chloroform and ether, 1 in 8,014 ; 1 in 4,890, chloroform, ether and alcohol ; 1 in 26,268 with ether. Indeed, with the last drug, but one death is recorded, and it is pleasant to find that the number of cases in which ether is given has increased year by year. The fact that deaths have occurred even when Pictet's chloroform is used, tends to show that fatalities cannot, in the absence of other causes, be assigned to the presence of impurities in the drug.

THE Duke and Duchess of Saxe-Coburg and Gotha have most graciously and kindly consented to open the Exhibition of Pictures in aid of the Dental Hospital of London to which we referred in our last issue. We understand that they have also sent a cheque for £10 10s. towards the incidental expenses. The exhibition will be opened on Monday, June 25th and remain open till July 2nd. Tickets—Serial, admitting for the opening and every day 1 guinea. On the opening day, 10s. 6d. ; any other afternoon, 2s. 6d. each. Admission up to one o'clock by payment of 1s. Tickets may be obtained from the Hon. Sec., Mrs. W. Knowsley Sibley, 7, Upper Brook Street, W., also from the Secretary at the Hospital, Leicester Square, W.C. The Hungarian Band will play, and the following well-known Musicians and Vocalists will appear during the week, Signor Tito Mattei, Mr. Edgar Homan, Mr. R. Watkin Mills, Mr. C. Kenningham, Mrs. Jean Hume, Mlle, Eissler and the Mlles. Clara and Marianne Eissler (Court Harpist and Court Violinist to H.R.H. the Duke of Saxe-Coburg and Gotha), the Misses Kate Cove, Grainger Kerr, Gladys Wood and others.

A HIGHLY successful conversazione was given by the Students Society at the National Dental Hospital on the 23rd ult. All the rooms of the building were thronged by visitors listening their various entertainers. In the Waiting Room, the President, C. W. Glassington, Esq., and the Council, received ; in the Stopping Room, the following programme of music was performed during the evening :—Pianoforte Solo, Mr. W. R. J. McLean, Mus. Bac. ; Song, "My Heart and Thine," Mr. A. Smith ; Recitation, Part of Churchyard Scene from "Hamlet," Mr. C. Fox ; Song, "Ave Maria," Miss Florence Jamieson ; Folk Song, "The Farmer's Daughter," Mr. C. T. Johnson ; Violin Solo, "Legende of Wienaski," Mr. Reginald Ward ; Song, "The Desert," Mr. W. Sunderland ; Whistling Solo, "Bid me Discourse," Dr. McCaully Hayes, accompanied by Mrs. McCaully Hayes ; Song, "Because," Miss Florence Jamieson ; Song, "The Green Isle of Erin," Mr. C. T. Johnson ; Whistling Solo, "Ill carne rale," (Danse Italienne) Dr. McCaully Hayes, accompanied by Mrs. McCaully Hayes ; Song, "Take a Pair of Sparkling Eyes," Mr. A. Smith ; Humorous Sketch, Mr. W. R. J. McLean, Mus. Bac. Mr. Sidney Spokes, in the Mechanical Laboratory, gave us a "Quarter-of-an-hour with Rembrandt" (with oxy-hydrogen lantern) ; followed

later by Dr. George Cunningham, who took us "To the Chicago Dental Congress and Back in Twenty Minutes" (with oxy-hydrogen lantern); whilst in the Board Room were Microscopes under the care of Mr. F. M. Farmer; in the Museum, The Phonograph; and in Demonstration Room, "Prestidigitation," by Mr. Percy Cooper. During the evening selections of instrumental music was played under the direction of Mr. E. A. Johnson, and refreshments were served in the Lecture Room.

Abstracts and Selections.

TIN AS A FILLING MATERIAL.

By Dr. S. G. PERRY.

At the meeting held in Brooklyn a week ago last Monday, Dr. Darby read a paper on the subject of filling-materials, and took occasion to speak very favourably of tinfoil, and also to show that society some specimens which had been shaved off a revolving wheel of block tin attached to a lathe. He made the claim that pure tin when prepared in that way with a fresh surface, possessed an adhesive property which is not found in tin-foil, and he showed some specimens of the tin prepared, and a large number of teeth which had been filled by his students, where the fillings had been built up to quite an extent,—as much as would sometimes be seen with gold, which of course would not be possible if the tin used had not a considerable adhesive property.

When it is first shaved off from the wheel there is no doubt it has cohesive properties which we have never found in tinfoil. Dr. Darby has used tin in this way for about eighteen years. I cannot tell you to what extent he has used it during that time, but he exhibited his old book of lectures to his students, in which he explained this as one of the ways in which tin could be used. I have tried it in quite a number of cases since he has shown it to me and it certainly works well. How long that cohesive property will continue of course I do not know. I suppose it will be lost after being exposed to the air for a while.

It affords me an immense amount of satisfaction to see this question brought up in this way. In a paper which I read in Brooklyn the month before, I spoke very strongly in favour of tinfoil. Tin was the material I learned first to fill teeth with, and I have

never lost my love for it, not only because of the ease with which it can be worked, but because of its remarkable preservative properties. One of the greatest compliments that can be paid to tinfoil is that you have heard men all your life say, when a new kind of gold is introduced, "Why it works more like tinfoil than any gold I ever saw."

To-day I saw the remnants of a tin filling on the approximal surface of a molar tooth which a patient of mine said I had put in about fifteen years ago. It had worn away until there was only a slight layer in the cavity. I had not seen her for a long time and the tooth had remained for quite a long period only partially filled. I took the remaining portion of the filling out of the cavity, and put in a new one without touching the tooth with an instrument. I simply put in a new tin filling where the old one had been. I think it would be a great good fortune to patients as well as operators, if there could be a sort of revival of the use of tinfoil. I certainly feel that in our search for other materials we have overlooked this material. We have given it the go-by, and many of us without any reason. I believe that a revival of its use would be a good thing, used discriminately, of course, particularly in grinding surfaces of young teeth, and on certain buccal surfaces, but not too much perhaps on proximal surfaces, because we all know there will occur that softening which is due probably to acid action; for a tin filling does better if the surface is exposed where there is a little attrition to keep it bright and smooth.

In years gone by I have many time filled young front teeth on the proximal surfaces, using tinfoil instead of gutta-percha. Of course it make a little shadow between the teeth, but it does not discolor. Sometimes it will be found to be more durable than gutta-percha, where the teeth are not quite ready for gold fillings.—*International Journal.*

CHEMICAL RESEARCHES ON THE MINERAL MATTER OF BONE AND TEETH.

Dr. S. GABRIEL (*Ztschr. f. physiol. Chem.*) expresses the composition and properties of the ash of bone and teeth by the following general formula:— $\text{Ca}_3(\text{PO}_4)_2 \times \text{Ca}_5\text{HP}_3\text{O}_{13} \times 2\text{H}_2\text{O}$, in which from two to three per cent. of calcium is replaced by magnesium, potassium, and sodium, and from four to six per cent. of phosphoric

acid is replaced by carbonic acid, chlorine, and fluorine. The quantity of chlorine amounts to only a few hundredths of one per cent., except in the enamel of the teeth, which contains a relatively larger quantity (0.21 per cent.) Fluorine is a constituent of both bone and teeth. The quantity does not usually exceed 0.05 per cent. of the ash, rarely amounting to 0.1 per cent. In direct contrast to the other solid tissues of the body, bone and teeth contain more sodium than potassium. While the quantities of calcium and phosphoric acid vary only inconsiderably, yet the magnesium and carbonic acid vary inversely with these, so that the sums of the two bases and the two acids are constant. The distinctive character of the ash of particular bones depends on the variation of the amount of calcium and phosphoric acid replaced, and also on the nature of the replacing radicles. The difference that exists between bone ash and tooth ash is not greater than the difference which has been observed in the ash of different bones. In enamel there is less, and in the body of the tooth relatively more, calcium replaced by magnesium than in bone ash.

As the formula indicates, the phosphate is basic in character and is probably a combination of a neutral and a basic phosphate. The relative valence of the acid and basic radicles is as 15 : 16. Water is present in two combinations—water of crystallization driven off at from 300° to 350° C., and water in chemical combination, driven off at white heat when the substance is mixed with silicic acid.—*Ohio Journal*.

THE EARLIEST HOSPITAL ON RECORD.

IN ancient times when disease overspread a nation, the churches did what they could for its alleviation and arrest. It was in obedience to the Sibyl's command that those physicians of Epidaurus arrived to assist the inhabitants of plague-stricken Rome and to found on the Island of the Tiber the first general hospital of which there is any authentic record. It has long been in ruin. The nature of its position and the fact that it is nearly always under the Tiber's waves render it difficult to obtain an illustration.—*Lancet*.

LONDON HOSPITALS BEFORE THE REFORMATION.

BEFORE what is known as the period of the Reformation—i.e., prior to the abolition of the monasteries in the year 1400—nearly a dozen hospitals were in existence for the relief of the poor of London named, as was usual in those times, after patron saints or founders. What is now known as St. James's Palace was once a hospital founded for the reception of "fourteen leprous women and eight brethren." It was the first English hospital of which we have any record. The date of its foundation is not known, so early was it in existence, but it was rebuilt in the time of Edward III. The hospital came to an end before the death of Henry VIII. for want of English lepers. In the waste lands beyond Holborn, where land was easily procured,

the Queen of Henry I., "the good Queen Maud," founded St. Giles's to be a hospital for leprous men and women. The year 1123 saw instituted immediately without the walls of the City the oldest of the hospitals now existing in London, St. Bartholomew's, to be within whose precincts is to be in "the very middle of the sacred land of Medicine." St. Bartholomew's has flourished as a hospital for more than 750 years. Through its gateway, which since that time has been open to the sick poor, "passed men of the generation whose fathers saw William the Conqueror enter London." St. Bartholomew's Hospital was founded in the year 1123 by Rahere. The hospital had an independent constitution and a separate estate, though it was for some purposes under the control of the Priory of St. Bartholomew, of which the church still remains in Smithfield. It was from the beginning a hospital for the sick and not a mere almshouse. Among its earliest benefactors were Thomas à Becket, Archbishop of Canterbury, Henry FitzAilwin, the first Lord Mayor of London, William Longespee, one of the witnesses of Magna Charta, and King Henry III. The hospital was finally separated from the Priory in 1537. The revenues of the hospital passed into the possession of Henry VIII., who in 1544 on the petition of Sir Thomas Gresham refounded it by Royal Charter and in 1547 gave it a new charter by which the greater part of its revenues were restored.

The wife of King Stephen in 1148 had a hospital built near the Tower called St. Catherine's, chiefly "for oldish people," a description which no doubt included many cases of chronic disease. The sister of Thomas à Becket and her husband founded St. Thomas's of Acon in honour of Thomas à Becket, who was then made a saint and a martyr. Another institution of this kind was built by Henry of Northampton in 1180 near St. Paul's. St. Mary's was erected in Bishopsgate Street Without about the year 1197.

St. Thomas's Hospital was originally built in connection with the monastery of St. Mary Overy, upon the site of which St. Saviour's Church is now standing. Originally this hospital was built as part of the monastery, but afterwards, in 1207, it was built separately close to the monastery. There it remained until the railway at London Bridge necessitated its removal to the present site on the Thames Embankment.—*Lancet*.

CORRESPONDENCE.

[We do not hold ourselves responsible in any way for the opinions expressed by our correspondents.]

TOOTHACHE.

To the Editor of the "DENTAL RECORD."

SIR,—I have read most carefully Mr. Main Nicholls' interesting article upon "Odontalgia," but that gentleman appears to have overlooked German treatment thereof. Vide—*Encyklopädie der Gesammten Medicin, im Vereine mit mehreren Aerzten herausgegeben von Carl Christian Schmidt*, Zweite Ausgabe, Zweiter Band, cadmium bis Furunkel, Leipzig, 1848, *Durchbohrung des*

Ohrkläppchens. "Diese Operation gehört jetzt vorzugsweise der Chirurgia cosmeticean. Von den Aerzten der frühern zeit ist sie als ein Albeitungsmittel bei verschiedenen Frankheiten, die am Kopfe vorkommen, namentlich bei chronischen Entzündungen und Ausflüssen des Ohrs, bei chronischen Augenentzündungen und bei rheumatischen Zahn—und Kopfschmerzen empfohlen worden," p. 177—this statement is from *Lincke*. "I believe it is a popular notion, that gold has chemical healing qualities when worn in ears," hence all children in "*Lydia*" and "*Thrygia*" wore earrings—thus the same idea appertains to *toothache* in domestic surgery in German Nationalities, because, now this practise effects nerves which belong to the face, and causes "*Odontalgia*," and ear-boring is then a remedial agency therefore, even under medical advice both sexes insert golden wires. "Fugit hic locus Caspareu Bartholinum in exudito de in auribus reterum syntagmate, qui inter alia docet etiam pueris osuamenti causa lobos amium pertusos exillisque suspensa stalagmia." The panacea when "*chronic Ophthalmia*" appears is ear-piercing, and also wearing wires for soldiers and sailors, for eyes are thus strengthened through this precaution.

6, Cale Street, S.W.

I am sir, Yours truly,

May 17th 1894.

M. DROUGHT.

P.S.—Our prudent ladies, who are mothers, being also educated in surgery, use their science to relieve suffering babies, simply in thus causing a sound and rapid counter irritant, merely boring the ears and placing therein rings, and thus always preventing miseries of teething for both sexes who are thus saved much discomfort through early piercing of the ear lobes.—M. D.

THE GENERAL MEDICAL COUNCIL.

To the Editor of the "DENTAL RECORD."

GENERAL COUNCIL OF MEDICAL EDUCATION AND REGISTRATION
OF THE UNITED KINGDOM.

229, Oxford Street, London, W.

May 30th, 1894.

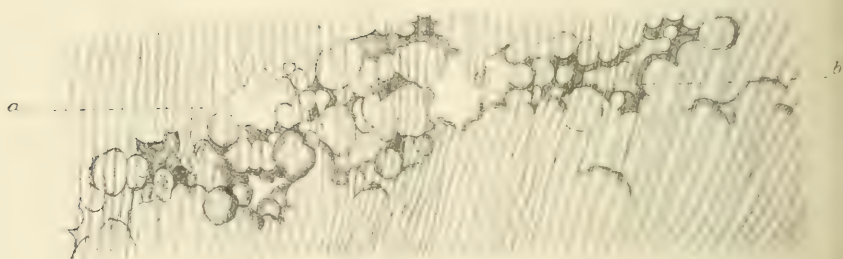
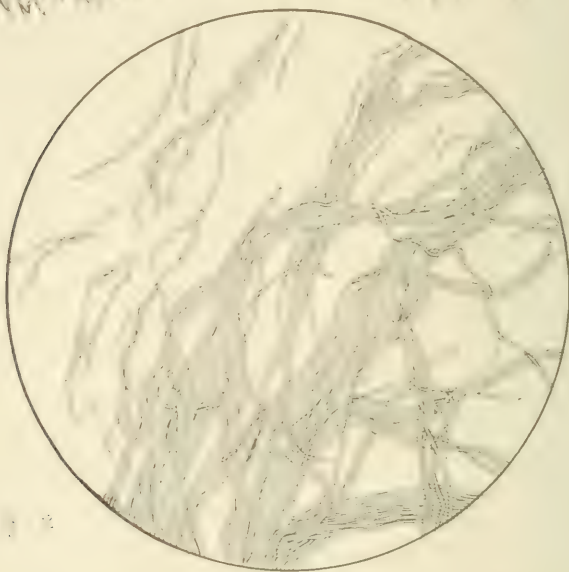
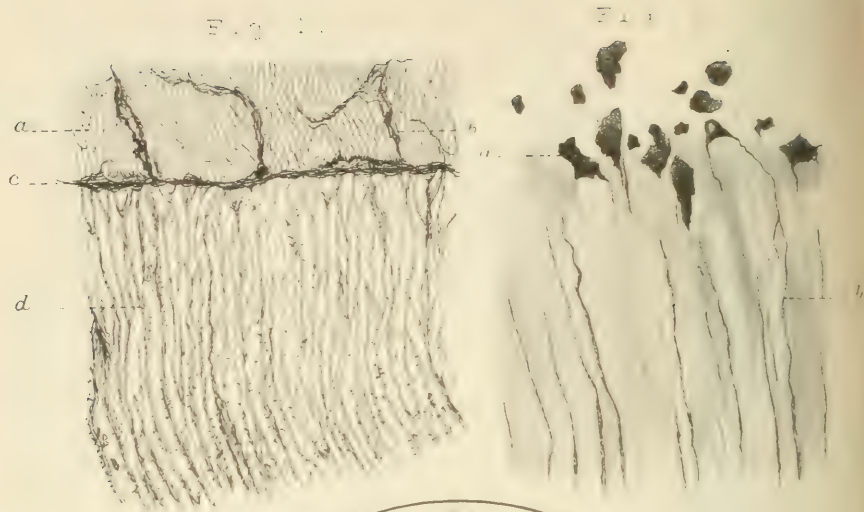
SIR,—By order of the General Medical Council, I am directed to communicate to you the following Resolution, passed by the Council on May 28th, with a request that you will call attention to it by some leading article or otherwise, in a prominent position in your Journal:—

"That the attention of the Council having been called to the practice of advertising by certain Dentists, it is hereby resolved that the issue of advertisements of an objectionable character, and especially of such as contain either claims of superiority over other Practitioners or depreciation of them, may easily be carried so far as to constitute infamous or disgraceful conduct in a professional respect."

Yours faithfully,

W. J. C. MILLER,

Registrar.



Description of Plate II.

Fig. 1.—Amelo-dentinal junction, longitudinal section: ground down: unstained: $\frac{1}{8}$ inch objective and A ocular: shews (a) enamel: (b) fissures in enamel: (c) amelo-dentinal junction: (d) dentinal tubules, their branches and terminations.

Fig. 2.—Sheaths of Neumann, decalcified and teased out: carmine: $\frac{1}{8}$ inch and A ocular.

Fig. 3.—Dentine, transverse section: ground down: stained methylene blue: $\frac{1}{8}$ inch and A ocular: shews (a) lacunæ of cementum: (b) tubules terminating here and there: in lacunæ.

Fig. 4.—Dentine, interglobular spaces, longitudinal section: ground down: unstained: $\frac{1}{8}$ inch and A ocular: shews (a) interglobular spaces: (b) dentinal tubules crossing over the interglobular spaces.

THE DENTAL RECORD.

VOL. XIV.

JULY 2ND, 1894.

No. 7.

Original Communications.

DENTAL MICROSCOPY.*

BY

Mr. A. HOPEWELL SMITH, L.R.C.P.Lond.,
M.R.C.S.Eng., L.D.S.Eng,

[ALL RIGHTS RESERVED.]

(Continued from page 258.)

ON THE PREPARATION OF THE HARD TISSUES.

AT the outset of practical Dental Microscopy, it must be clearly understood by the student, that, having mastered all the details of the management of a microscope, it is of the highest importance, in the preparation of tissues for histological purposes, to treat his specimens, both chemically and mechanically, in such a manner that their structures will be altered as little as possible. It is a very great question whether or not one ever sees through the microscope tissues which are not somewhat changed in appearance, either by swelling or shrinkage. The student's aim, therefore, is to prepare sections free from these defects, and the

* NOTE.—The drawings throughout this work are made for the most part, from original photographs.

employment of fresh materials, re-agents, and reliable processes, cannot be too strongly insisted upon.

General Principles.

There are two chief principles of treatment to be adopted when preparing the hard dental tissues for microscopical examination and research, and each, in its own way, answers the purpose admirably. These are:—(A) RUBBING or GRINDING DOWN the tissue in its uncalcified state. (B) CUTTING BY MICROTOME after decalcification.

A.

*Grinding
down Hard
Tissues.
Advantages
and
Disadvan-
tages.*

The former is the older and more general method. For many years it has been a favourite with histologists, but it possesses several serious drawbacks. Broken-down detritus, dust and air, get into and are retained in the interspaces, and though the sections shew degrees of contrast well, they are very much spoilt if extraneous matters are also present. It is difficult, too, to get a portion of tooth thin enough for examination with the higher powers. Very often pieces of the part to be preserved break in a most disappointing fashion at the last moment, and the work of hours is thereby rendered useless. Ground-down sections take stains badly, as a rule, that is to say, the colouring matter penetrates the parts somewhat imperfectly. Only two or three specimens can be obtained from one tooth, and sometimes it is necessary, when investigating matters, to make sections from a single specimen, in transverse, horizontal, and in vertical directions. This can easily be done if the tissue be decalcified, but only with very great difficulty if the simple grinding-down process is adopted. It must also be remembered that such mechanical manipulations are at times tedious, irksome and

lengthy. Still, the method of grinding-down must not be considered by any means obsolete. The structure of the hard parts is well retained and exhibited.

The following are the chief methods employed :— *Various Methods.*

(1) *Grinding-down Sections of the Hard Tissues on a Wheel.*

The tissue is held by means of the finger tips on the right hand side of a vertical, rapidly revolving, sharp, dry corundum or carborundum wheel, until a perfectly flat surface results. Great care must be taken, for, if the wheel revolves too rapidly, the tooth will probably be cracked or broken. Much heat and a smell of burning dentine are evolved, which make it rather unpleasant. The flat surface is now rubbed down on a dry Arkansas stone, and finally, to remove all scratches, polished on a razor strop, also used dry. The finished side is then fastened on to a piece of thick glass—a microscope slide will do—with hard Canada balsam, which has been previously warmed and softened over a spirit lamp. After the balsam has cooled a little, the polished tooth surface is pressed into it, flat on to the glass, and allowed to remain there. When the balsam is set hard, which, in practice, may take some days, the exposed surface of tooth may be ground and polished in the same way. The tooth is then ready for mounting.* Soluble glass (silicate of soda) with hydrate of sodium may be used and is even preferable to Canada balsam for fastening the specimen on the slide. A drop is placed on a slide, and the polished surface of the section pressed on to it. In a few hours the slice of tooth is quite firmly fixed, and grinding and polishing can be proceeded with at once. Thus, much saving of

*Mr. Charters
White's
Method,
Modified.*

* The Methods of Mounting will be given in a future article.

time is effected. Care must be taken to avoid wetting the specimen, as water dissolves soluble glass. Resin and wax (3 to 1) may be also substituted for the above media. It will be noticed that everything here is done in a dry condition, and a mere skeleton of the tooth remains.

Mr. Charters White, who originally introduced this plan in 1885,* recommended the use of a wet buff leather, with putty powder sprinkled on it, but the above mentioned method is perhaps better.

(2) *Rubbing Down Between Plates of Glass.*

*The Wet
Method.*

Slices of the hard portions of a tooth are cut under dripping water with a fine fret-saw. If it is sharp it easily cuts dentine. The enamel, being extremely hard, will require notching previously with a very thin corundum wheel.

If it is not desired to make more than one section from the same specimen (*e.g.*, the lower jaw of a rat with teeth *in situ*), it saves time to do the preliminary grinding under water, on a corundum wheel. In this case the tissue need not be fixed by balsam on to glass, but should be ground down on both sides, the fingers holding it on the wheel.

Place a slice of the specimen between two plates of ground glass, their dull sides meeting. It is convenient to have the lower plate the larger of the two, 18-20 inches square. The upper should be 10-15 inches square. On the top of the tooth pour a little water, and add a small amount of the finest pumice powder. With a rotary movement of the upper glass, rub down the section till it is thin. Towards the end of the process, carefully watch the section through the upper glass, using no pumice, but plenty of water. Old and worn ground-glass

* Transactions of British Dental Association, Annual Meeting, 1885.

plates are useful for polishing already thinned sections, and should be kept for this purpose. When the section is quite transparent, remove it from the glass carefully with the fingers, or a pair of fine forceps, wash in water, and then place it in a bottle of alcohol, till the time has come to mount it.*

The following modifications have recently been introduced :—

Mr. Dunkerley ("Journal Royal Microscopical Society," part 6, 1892) proceeds as follows :—

*Mr.
Dunkerley's
Method.*

"Sections are cut off the tooth, by means of a thin copper disc, fitted to a dental lathe, and revolving in a trough containing water and fine corundum powder. The thin disc is now replaced by a thick one, with the same trough and contents. The sides of this disc are used as a lapidary's stone to grind these sections thinner, one side of which is next polished on Water of Ayr stone, under running water, this surface being afterwards secured to a glass slip by thick Canada balsam. The grinding of the section on the thick copper disc is now proceeded with until the section is thin enough to see the structure; then proceed to polish this surface on the Water of Ayr stone, until all details are visible under the microscope, when, after careful washing, the section is mounted."

The plan seems well adopted for cutting sections of specially large teeth, *e.g.*, molars of horse, elephant, etc.

Mr. J. J. Andrew's Plan:—The tooth to be ground is cut into as fine a slice as possible, by the aid of small saws. It is then reduced in thickness by grinding on a corundum wheel on the lathe, a

*Mr.
J. J. Andrew's
Method.*

* In connection with this, the student is referred to Mr. Charters White work on "The Microscope and How to Use It," 1893, pp. 38-42

copious supply of water being allowed meanwhile to flow over the section. The finger presses it carefully against the wheel, until it is very nearly thin enough for microscopic examination. It is finally ground between a couple of fine soft hones, made of Hindostan or other stone of similar fineness of grit, finishing to remove scratches between two Arkansas hones. The section is then well washed, the water dried off between the folds of fine blotting paper and mounted in Canada Balsam.

*Mr. Dencer
Whittles
Lathe*

Mr. Dencer Whittles recently exhibited a lathe which he has devised for carrying stones for grinding-down purposes. It is placed on end and mounted on a table. The wheels revolve horizontally, in this case, the motor power being produced by the lathe band passing over pulleys which are placed at right angles to the treadle wheel. This arrangement will prove very useful for the final grinding and polishing of sections that have been prepared by Weil's process.

B.

Decalcification of the Hard Tissues.

*Decalcifica-
tion of Hard
Tissues.
Advantages
and
Disadvan-
tages.*

It has been the fashion of late to decry the use of acids for decalcifying purposes, but rapid softening, which the writer strongly upholds, seems quite satisfactory. It is true, that one cannot tell the precise chemical actions that occur when an acid is brought into contact with dentine or enamel: it is true, that it appears to be destructive to the tissues, and, it must be confessed, changes them somewhat, but, given the immense advantages accruing from its use, it will be found, that, as a rule, more instruction can be gained from decalcified sections than from those ground or rubbed down. To briefly mention these advantages, it may be said, that the sections are much thinner than those of

non-decalcified teeth. Any number can be obtained from one and the same tooth. They stain well, and can be rendered very transparent. It is also, more easy to cut them, while the trouble of preparation is reduced to a minimum.

There are many decalcifying fluids and acids now used in histological work, the best known being, hydrochloric, nitric, picric, chromic, acetic, and arsenic acids. The prolonged immersion of a tooth in commercial glycerine softens and removes the lime salts; but it is not used for decalcifying purposes, unless combined with hydrochloric acid in the proportion of glycerine 95 and acid 5 parts. The mixture acts slowly, too slowly almost, but preserves specimens while it softens them. It possesses the merit that it does not seem to blur or destroy the structure of dentine or cementum. These decalcifying agents are here enumerated in the order of their importance and usefulness in Dental Microscopy. Their strengths vary considerably; thus, hydrochloric acid is most useful when made up to a 10 per cent. solution, picric—a cold saturated aqueous solution, and nitric and chromic, in one per cent. solutions. The last named acid is also particularly serviceable in a crystalline form. Strong solutions are recommended in preference to weak ones. It is a rule, with but few exceptions, that the after-effects of the acid solution should be neutralized by immersion in an alkaline fluid. Bicarbonate of soda, one dram to one pint of water, is perhaps the most convenient.

*Decalcifying
Agents.*

All acid solutions must be perfectly fresh and kept in glass-stoppered bottles, wooden instruments and aluminium or plated section lifters being used in manipulating the tissues.

It is very advisable to employ a fixed quantity of

acid solution in decalcifying teeth and bone. The writer finds that twelve c.c., or four fluid drachms is a good quantity to use. The bottles used by Wolrab for packing gold cylinders will easily contain the amount.* This rule applies chiefly to the hydrochloric acid solutions. By using this fixed quantity, the exact strength is known, and the probable length of time required for softening can be readily ascertained. The bottle should bear a small label, on which are noted the kind of specimen, the name of the solution in which it is immersed, and the date of immersion, to be followed by another small label, giving details of times of changing the solutions.

But, after all, the proper strength and periods of time for immersion can best be learnt by experience, because they depend, not only on the size of the tissue, but on its quality and structure. No hard and fast rules can be laid down.

Other Methods of Decalcification.

Dr. Black, in "Periosteum and Peridental Membrane," speaks of using a 3 % solution of nitric acid. He remarks:—"It has been found that the element of time is . . . more important than the strength of the acid solution employed."

Bödecker† has been able to make specimens of teeth provided with *all* the hard tissues, by first grinding fresh teeth on a corundum wheel, and then decalcifying the thin section, in a large quantity of a $\frac{1}{2}$ per cent. solution of chromic acid, for one or two days. Dilute glycerine is the solvent.

Ebner's decalcifying fluid consists of:—

H Cl.	1 gramme.
Na. Cl.	10 grammes.
Water to	100 c.c.

* This is a form of corked sample bottle.

† Heitzmann's "Microscopical Morphology of the Animal Body," page 613.

This is a useful formula, but great quantities of the solution must be used, and it should be quite fresh.*

Hart, of New York,† divides a tooth into several pieces and immerses them after they have been ground thin, in a six per cent. solution of glacial acetic acid. Here they remain for ten hours, and are subsequently treated in the ordinary way.

Kleinenberg's formula is :—

Saturated aqueous solution of picric acid	100	parts.
Strong sulphuric acid	... .. 2	„
Filter and add, distilled water	... .. 300	„

Lepkowski‡ suggests the sub-joined method for preparing sections of dentine, which possesses the advantages of simultaneously softening and staining it.

Pieces of teeth, which should be no thicker than $\frac{1}{2}$ m.m., are placed in a solution made of pure formic acid 3 parts, and 1 per cent. aqueous solution of gold chloride, 6 parts. They remain here for twenty-four hours, are then removed, washed with distilled water, and placed in a mixture of gum arabic and glycerine for twenty-four hours. On removal, they are again washed in distilled water, then alcohol, and finally embedded in celloidin or paraffin.

The following are good methods for the preparation of specimens for the

Demonstration of Special Hard Tissues.

Enamel Fibres can be prepared by immersing a tooth in 12 c.c. of a 10 per cent. solution of hydrochloric acid. At the end of thirty hours, on removal from the acid, the enamel will be quite soft. A small

*To show
Enamel
Fibres.*

* Crookshank's "Practical Bacteriology," 1890, page 25.

† "Dental Cosmos," September, 1891.

‡ "Journal British Dental Association," Vol. XIV., p. 248.

portion should be taken up with a needle, or brush, and placed on a slide. The mass should then be teased out with needle points, and a drop of normal salt solution placed on the top, and a cover-glass applied. The staining is effected by allowing a solution of carmine or rubine to run beneath the cover-glass by capillary attraction. Excess of stain can be removed by blotting paper, and further washed away by irrigation with water acidulated with one per cent. acetic acid, and in this or in salt solution, the enamel prisms are mounted (Plate 1, Fig. 2). It is important to "ring" the cover-glass as soon afterwards as practicable.

*Nasmyth's
Membrane.*

Nasmyth's Membrane.—Immerse a permanent human tooth, by preference a newly erupted one. (although the membrane persists over all, even old teeth), in a 10 per cent. solution of hydrochloric acid. In two and a half hours the membrane will begin to be separated from the surface of the enamel, and can soon be removed by means of a wooden needle-like point or brush. It should be washed in alkaline solution, then in water, and finally kept in rectified spirits of wine for further treatment (Plate 1, Fig. 5). Sections of Nasmyth's membrane, *in situ*, may be obtained by first grinding down a tooth, as already described, placing it on a slide, and putting over it a cover-glass. If the hydrochloric acid solution be now run underneath the cover-glass, in a few hours the membrane will become detached from the free edge of enamel, and afterwards can be permanently mounted.

*Sheaths of
Neumann.*

The Sheaths of Neumann. (Plate 2, Fig. 2.) Break a tooth into four or five pieces in a vice, and place the fragments in a 10 per cent. solution of hydrochloric acid. At the end of three days, change the acid. At the end of five days, add 5 c.c.

of pure nitric acid. At the end of seven days, remove the pieces from the solution. Transfer the soft mucoid deposit, which has collected at the bottom of the Wolrab bottle, to a glass slide, and tease it out with needle points, after a drop of distilled water has been placed over it. Press down a cover-glass, and stain with borax or lithium carmine, which should be allowed to run underneath, as first described.

The sheaths are thus isolated, and very similar in appearance to yellow elastic connective tissue fibres.

To Shew Dentine and Cementum. (1) Take a newly extracted tooth (human) and place it in a solution of *Dentine and Cementum.*

Chromic acid (crystals)	10 grains.
Water	8 ounces.

It should remain here for two days, at the end of which time, a fresh solution should be used.

(2) Then immerse it in a solution of

Chromic acid	20 grains.
Water	8 ounces.

for four days.

(3) Finally, place the tooth in

Chromic acid	20 grains.
Water	4 ounces.
Hydrochloric acid ($2\frac{1}{2}$ per cent. sol.)	4 ounces.

The latter should be added about ten minutes after the chromic acid solution is made.

(4) Remove the tissue to fresh solutions made up according to the last formula, every fourth day, until it is sufficiently soft (eleven or twelve days).

By using the chromic acid as mentioned, the advantages derived from the employment of fresh agents are assured.

Wash the tooth for twelve hours under running water, after it has been immersed for half-an-hour in an alkaline solution.

Another and more usual method for efficiently showing the structure of enamel, dentine, and cementum, is to make a vertical section of an adult human tooth, by first grinding down on a wheel, and then between plates of glass, finally mounting the section, unstained, in Canada balsam.

Laminae.

Laminae in Dentine can be demonstrated by adopting Mr. F. J. Bennett's glycerine methods.*

These are briefly the following:—

(a) Freshly extracted teeth are ground down until very thin. The sections are then polished, and suspended in pure glycerine, or glycerine and bicarbonate of soda, for one to six months. Then they are washed and mounted in glycerine; or,

(b) Freshly extracted teeth are immersed whole in pure glycerine for a similar period. Then ground down, polished, and mounted; or,

(c) Whole teeth are placed in a very diluted solution of glycerine, whose strength is daily increased until pure glycerine is used. Then they are kept in this for one to two months, and heated as in (b).

The structure of *Cementum*, *Interglobular Spaces*, *Striae of Retzius*, *Owen's* and *Schreger's lines* are all best demonstrated by grinding-down and polishing, and, generally speaking, leaving the tissue unstained.

Fish's Teeth and Jaws of Animals can be prepared by either grinding-down or decalcifying them. Small teeth and jaws are difficult to grind down, and sections are therefore better prepared by

*See "Transactions, Odontological Society of Great Britain," November, 1888.

immersion in acid, *viz.*, either a 5 per cent. solution of chromic acid, or 10 per cent. of hydrochloric acid, and after washing and neutralization, impregnation with gum or paraffin prior to their cutting on a microtome.

Table of Hard Tissues suitable for Preparation by

GRINDING OR RUBBING DOWN.	DECALCIFICATION.
1. Human teeth (adult), to show normal relationship of Hard Tissues.	1. Individual isolated Hard Tissues, <i>e.g.</i> , enamel prisms, dentine affected by caries etc., sheaths of Neumann, etc.
2. Jaws of animals, <i>e.g.</i> , rat, monkey, etc,	2. Alveolus and bone of jaw.
3. Teeth of large animals, horse elephant, etc.	3. Jaws with temporary and permanent teeth, <i>in situ</i> .
4. Fossil teeth.	4. The teeth of fish, pike, hake, etc
5. Certain pathological conditions of the Hard Tissues, <i>e.g.</i> , caries of dentine, exostosis of cementum, etc.	5. The teeth and jaws of small animals.
6. Cases in which it is necessary to retain the enamel.	6. Cases in which it is unnecessary to retain the enamel.
7. In connection with Weil's process.	7. In connection with the author's process.

(To be continued.)

DENTAL EDUCATION.*

By Mr. H. W. NORMAN.

MR. PRESIDENT AND GENTLEMEN,

I desire to draw your attention this evening to the subject of "Dental Education as Viewed from the Student's Standpoint," for although it may be a well-trodden path, yet that should be no reason for not entering upon it. Well-worn as the subject may be, there are still some points that need threshing out, and we should all seek to do our best in this way, one step in the right direction

*A Paper read before the Students' Society of the Dental Hospital of London.

being to freely discuss this paper. I am sure you will agree with me, that it is a subject of great moment not only to us, but much more to those who will follow after us, and one about which we all ought to have something valuable to suggest.

Dental Education for many reasons is a most difficult and delicate subject to deal with, and to arrange it to suit the whims and fancies of every member of our profession would be a hopeless and thankless task, yet considering how great the interests at stake are, its difficulty should be no reason for us to unheedingly pass it by; but we should rather devote our best energies to master it, and although we may be only students (we shall all be L.D.S. men in the sweet by-and-bye) we should have at least a voice in the matter, and discuss it in our own free way.

Our subject for this evening may be split up into its two main divisions

GENERAL EDUCATION AND PROFESSIONAL EDUCATION.

Upon the thoroughness with which a man has devoted himself to his general education depends a great deal his after success, for it is a well known fact that patients do not judge a man so much by the qualifications he possesses, as by his general demeanour and conversation, and of course the stability and quality of his work. In short, for a man to be a successful practitioner (and that is what we all aim at) he must be in every way a gentleman, and to be a gentleman he must be educated.

Although recognising that "general education" is that which paves the way to the more specialized subjects, yet we must not forget that it is that which prepares for the miscellaneous refinements of life.

Our "Professional Education" also having its own special objects in view. Now, I do not mean to say that this line which I have drawn between them marks them as distinctly separable; on the contrary, they are intricately entangled with one another, in fact, so much so, that there can be no training for the one, that is not in some measure a training for both; and hence it is, that the more thorough the "general education" a student has had, the better is he able to cope with his hospital curriculum.

Therefore all things considered, it is undoubtedly best for a boy on leaving school (should he be brilliant enough) to sit for the Matriculation Examination of the London University, and it has

from time to time been advocated that this should be the only preliminary, and those who advocate it argue, that the average school-boy at sixteen should have no difficulty in passing it ; in this I quite agree with them, if the boy would only apply himself, but not five boys in one-hundred at that age will ; how many of us were brilliant enough to get through without any difficulty ? I fear not a few of us found the College of Preceptors quite sufficient ; but to confine intending dental students to the London Matriculation would be unjust to those who, although they may not be prodigies of learning, yet are sufficiently educated to make in every way worthy members of our profession. Worthy too, of that title of "Gentleman" to which we must depend above all other qualifications if we desire to see our own pet profession rank amongst the foremost.

Passing to our "professional education," the first part of which necessarily being a thorough training in the workroom, and it is here that there is greatest want of improvement, the fault lying, I think, not so much with those to whom we are articled, as it does with ourselves, we are very prone on our arrival at the hospital, to lay the blame either at their door, or that of their workroom assistant.

I have heard of men, who during their apprenticeship have been kept at the mere drudgery of the workroom, never being allowed to pass on to better work, but I feel convinced that in most cases it is their own indolence and want of energy that has kept them in the back-ground.

What dentist is there but would be only too pleased to see his pupil advancing, and in time able to assist with some of the best work.

Another fault that is found with the present system of apprenticeship is, that having only one teacher, the pupil is necessarily confined to that teacher's particular methods.

To remedy these, and other faults, it has been proposed to establish a Mechanical Institute at which the student will be instructed in all the various branches of Mechanical Dentistry, and where he will not be confined within the narrow limits of the ideas of one man.

This proposed institute of which at the present day we stand in great need, will be a valuable and much appreciated addition to our

teaching-schools, and at which the student could at the end of his apprenticeship complete the acquirement of that aesthetic taste, which is so essential to the success of our mechanical appliances; but my own humble opinion is that it will not supercede the old system, for it is surely best to become thoroughly grounded in one method, than to be a Jack of all the different methods and a master of none, as I am sure would be the case, if the pupil spent all his time at this Mechanical Institute, and again if it takes three years at least, to learn the methods of one man thoroughly, then it is surely reasonable to expect that it will take much longer to learn at least several; but if, as before said, the pupil thoroughly masters the ways and ideas of one man first, then others at a later date will seem much simpler and be more quickly learnt. Looking aside at another profession for a moment, we find that the engineer first works his way through the shops, then completes himself at an institute; and our work bears a stronger relation to that of the engineer, than to that of the medical man, who in days gone by had his apprentice, he has no pupil now, but the engineer still finds the system to be the best. No, we must not find fault with the system itself, for with all its drawbacks and there are many, it is the best we shall ever have.

The fact is, the pupil needs something to stimulate him to greater efforts, and there is nothing that will do that so effectually as a thorough searching examination, which he must pass previous to entering on his hospital career. By examination, I do not mean one at which he may chance to have a repair to do, or a denture to flask and pack, but a good, say a three days' examination, which will ensure none but efficient men entering for their hospital curriculum; and to those who pass a certain standard certificates should be given. In this way, and I am afraid in no other, will the percentage of good workmen amongst us be raised, which I learn from good authority to be at a very low ebb.

There are those, I regret to say, who consider that it is not essential for the Dental Surgeon to be a thorough master of our mechanical art, they think it quite sufficient that he should know how a denture ought to be made, but I maintain that unless he be a good workman himself, he certainly cannot supervise his work-room assistant, and neither can he do those thousand and one little jobs (for I cannot call them by a more applicable term) which one

has every day to do in the surgery, and which require the dexterity of fingers that have long been in training in the workroom.

My own ideal of the most perfect system of mechanical training that it is possible to have, is, where the work is wholly executed by pupils, and as the senior pupil who of course superintends the workroom, and does all the best work, has completed his term of apprenticeship, and leaves, so the next steps into his place; and having for months past assisted, and largely helped his senior, he naturally has a certain amount of confidence in his own abilities; he cannot at first hope to work so well as his former companion, who had had more experience, but with the combined help of his principle it will not be long before he is efficient for the reponsible post it is his good fortune to hold. I say "good fortune" for it is only in such a post that we get the multiplication of experiences which afford material for the formation of definite opinions, only as each class of methods become familiar through the recurrence of cases coming under it, can the exact ideas of these advanced methods be truly grasped.

We will now pass to the consideration of that part of the subject which most concerns us as students;—namely our hospital curriculum,—when a student first sets out on his hospital career, he is greatly surprised at the immensity of the work he has to accomplish and the limited time he has to do it all in, when the conviction soon comes home to him, that it cannot all be done in the time, and that some parts here and there must be neglected.

Now, I consider that our curriculum should be so arranged, that in the two years every part of it could be done thoroughly and conscientiously, and again that the practical part should equally balance the theoretical. In the present state of things we are getting or ought to be, wonderfully theoretical, and I regret to say deplorably unpractical; evidently there is something wrong somewhere, the mistake is, too much time is spent at the general hospital, attending lectures the greater part of which are of little value to us; if we are such an important body of students at the general hospital, then why do we not have special lectures on such subjects as Surgery Medicine, etc., etc.

I do not agree with those who would see these and other subjects all taught at our own hospital, but I do think that we should have a special course in these subjects which are so extensive that they

must necessarily be split up into two courses, of which the dental student can only attend one ; we are bound to attend these lectures, but I am sorry to say that we gain very little from them. Again much time is taken up in dissecting the whole body, which with the exception of the Head, Neck and Thorax is scarcely necessary to us ; the extra knowledge which we should obtain, supposing the dissections to be carefully executed, would doubtless be a very valuable adjunct to us, but what proportion does it all bear to practice in the art of filling, and all the many and various branches of our dental work ? which on this account have to be so sadly neglected ; thus it is that we devote a great deal of time to getting a certain kind of information at the cost of much more valuable information and experience which we might else have got.

Of course our ideal would be complete preparation in all these subjects if it were possible in so short a time, but failing this as we all do more or less, our aim should be to maintain a due proportion of value between each subject.

"And our attention should be greatest where value is greatest ;

And least where value is least."

Now the question is not so much, whether such and such knowledge is of worth, but what is its relative worth ; when certain advantages are named, which are gained by a given course of study, it is apt to be assumed that such a course is justifiable, quite forgetful of the fact that the adequateness of the advantages is the point to be judged. Had we time to master all subjects, we need not be so particular ; to quote the old song:—

"Could a man be secure,

That his days would endure ;

As of old, for a thousand long years ;

What things might he know ?

What deeds might he do ?

And all without worry or care."

But we must ever bear in mind our limited time for acquisition, and before devoting so much time to lectures which fashion and the "powers that be" compel, it were surely wise to weigh with great care the worth of results as compared with the worth of alternative results, which the same time might afford if otherwise employed. This then is the question of questions with us, or I should say with those who are our teachers, and it is high time it was discussed in some methodic way ; the problem is how to arrange among the

conflicting claims of various subjects on our attention. I am sorry to have to leave this problem unsolved, but you will quite understand that it is not for me to dictate, I am merely looking at things from a student's point of view.

There is a subject which every year is becoming wider and more interesting to us, and at our hospital here we are in touch with some of its greatest authorities, I allude to the administration of Nitrous Oxide. There are now several ways of administering it, each method having its own special advantages and yet we are not yet taught it, much less have we lectures upon the subject, it is utterly impossible for us to learn all by merely looking on, and again we ought to have practical demonstrations as to how to proceed, in the event of many accidents which are liable to happen to the most careful amongst us. The subject is of such importance to us, that a few lectures (which I am sure would be attended by every one of us) and a month or two of practical experience would be of untold value to us.

And now, Gentlemen, I have practically finished my paper, but I would like to say a word or two with regard to a question which is being constantly raised amongst us; it is as to the advisability of taking a medical qualification. In answer, I would say it is undoubtedly a decided advantage if the student's time and pocket will allow him to take it either before or after his dental qualification, preferably before. It is an advantage in that it greatly increases his medical knowledge. It also sets him on an equal footing with those medical practitioners who make a speciality of a certain organ and over whom he has a great advantage, by being able to take out a diploma for his own speciality, but to take them concurrently is a very unwise proceeding as thereby he must of necessity neglect his dental work, the time and experience which he by so doing loses, being never again recoverable. There are those amongst us who for want of time, money or ability, cannot aim so high, and to those of us, I would say, that diplomas are not always the high road to success, and I am convinced that the practitioner who is gentle, kind, and untiring in his services to his patients will be successful equally with the man who has a longer tail to his name. In conclusion, let me add, that, those who in eagerness to obtain distinctions, often forget that success in this world depends more on energy than diplomas and that a policy which in cramming for exams., undermines energy—defeats itself.

Reports of Societies.

THE ODONTOLOGICAL SOCIETY OF GREAT BRITAIN.

THE USUAL MONTHLY MEETING was held at 40, Leicester Square, on the 4th ult., the President (Mr. F. CANTON) in the Chair. The minutes of the previous meeting were read and confirmed.

The following gentlemen signed the obligation book, and were admitted members of the Society :—Messrs. W. B. Sansom, L.D.S.Eng. ; Pillin, L.D.S.Eng. ; Rhys Price, L.D.S.I.

It was announced that Messrs. Aubrey L. Farebrother, L.D.S.Eng. ; L. G. Austin, L.D.S.Eng. (non-resident members) had duly signed the obligation form ; they also were admitted members.

Messrs. G. B. Webb, L.D.S.Eng. ; S. R. Apthorpe, L.D.S.Eng. ; Rowe, L.D.S.Eng. ; J. D. Whittles, L.D.S.Eng. ; were ballotted for and elected members.

Messrs. George Thomson, L.D.S.Eng. ; Louis Jeffery, L.D.S.Eng. ; and A. B. Densham, L.D.S.Eng. ; were nominated for membership.

The LIBRARIAN (Mr. W. A. Maggs) stated that Dr. Ottolengui's book, third edition, had been added to the library. The usual exchanges had also been received.

The CURATOR (Mr. Storer Bennett) reported that specimens of teeth showing somewhat marked exostosis, but in other respects not remarkable, had been presented by a non-member.

Mr. ROUTLEDGE (Newcastle-on-Tyne) exhibited and described an electrical motor designed to work the dental engine. He stated that the motors hitherto in use necessitated a high voltage to work them, and a high voltage depended not on the size but on the number of accumulators, consequently a considerable first outlay was involved. The motor he was now showing required only two accumulators to drive it, thus reducing the first cost by more than half. It also occupied less space. But its chief feature was that it could be clamped on to the dental engine without involving any structural alterations in it, all that was required being an extra pulley band. Where there was an electrical supply current it could be worked direct from the main.

Mr. G. NORTHCROFT showed three pairs of pliers which he had had constructed. He had found them so useful that he thought possibly members might be interested in having them brought to their notice. The first he employed for bending up pianoforte wire

for regulating bands, for making the Talbot coil, and for forming up "W" springs. The second pair he used for making caps out of the soft white metal used in cases of exposed pulp; it was made with three sizes of hole so that three different sizes of caps might be punched out with it; it was inexpensive, and would well repay the first outlay. The object of the third pair was to save the hands in crown and pivot work.

Mr. J. BLAND SUTTON said that the Society would probably remember that at the last meeting Mr. J. F. Colyer described a case of tumour on the left side of the mandible, the patient, a boy, being present. It was confidently thought at the time that it was an epithelial odontome, but Mr. Sutton had since removed the growth by operation, and it turned out to be not an epithelial, but a follicular odontome. It contained a well formed molar with two cusps, the roots being extremely well formed. The operation of removal was simple, the boy made a good recovery, and the deformity was only slight. The specimen was extremely interesting, and very useful for teaching.

Mr. GEORGE ROWELL, F.R.C.S., read notes of his experience of the comparative effects of N. O. Gas, N. O. Gas and Oxygen, and N. O. Gas and Air on the same patients. Different patients vary so much in constitution that in order to institute a true comparison between various anæsthetic agents it seemed to him desirable to employ them upon the same subject. In the gas administrations the apparatus was provided with an inspiratory valve, special care being taken to exclude all air. In order to obtain the fullest effects of the gas, the inhalation was continued to a point somewhat more advanced than usual. The gas and oxygen was given by Dr. Hewett's method, as described by him before the Society in June, 1892. The method of giving gas and air was to employ an ordinary apparatus possessing an inspiratory valve, special precaution being taken to eliminate all air from the gas and from the apparatus. Pure gas was administered for from ten to eighteen breaths, until the stage in which excitement was producible had passed, or almost passed. Then a single inhalation of air was given, followed by five to seven breaths of pure gas, then another breath of air, and again five or six breaths of gas. This procedure was sometimes continued until what was known as nitrous oxide stertor, or slight twitchings, manifested themselves, or until the breathing began to become

irregular, without either stertor or jactitation. On the other hand it not unfrequently happened that some eighty or ninety seconds elapsed without any of these symptoms, and the facepiece being removed, good anæsthesia resulted. The number of breaths of air to give, and the periods at which to administer them, depended upon experience. With noise, movement, active conjunctival reflex, and evidence of only a slight degree of anæsthesia, air should be withheld; with cyanosis, active conjunctival reflex, and snoring, air might be given with freedom. To have the gas free from air at first, and not to administer the first breath of air too soon, were the all important necessities; it was not of so much consequence as to how and when the air was administered. Of the three cases recorded all had very bad teeth; with this exception, case one was in fair health. She took gas and air first, and the breathing being deep the air was given rather earlier than usual; afterwards there was evidence of slight phonation, and in consequence she was allowed more gas than usual, until slight stertor began, which was controlled by another breath of air. She gave only slight signs of deprivation of oxygen at the end of eighty-five seconds, and had a good anæsthesia of forty-two seconds. With pure gas, phonation occurred at thirty seconds, and, except that she only had twenty-two seconds anæsthesia, the administration was typical. With gas and oxygen the phonation still occurred, but soon ceased and a typical anæsthesia of about thirty-two seconds resulted. It should be mentioned that there were only twenty-four hours between the administrations, which might render the two latter less satisfactory than the first,

In case two, the patient was extremely anæmic, and suffered from headache, neuralgia, dyspepsia, and breathlessness. Gas was first employed, and was pushed as far as possible with safety. The operator was just about to begin the second tooth when she was able to open her eyes, after twenty-eight seconds anæsthesia. A fortnight later she took gas and oxygen, and thirty-five seconds anæsthesia of the usual satisfactory character was obtained, strongly contrasting in such a patient from that obtained from pure gas. Gas and air a week later resulted in less asphyxial phenomena than with gas alone, anæsthesia thirty-five seconds, slight phonation noticed at thirty seconds. With regard to after effects, headache was said to be distinctly less than after gas and oxygen.

Case three. A strong type of girl, but very nervous. Typical gas administration, except that snoring developed early, and thirty-eight seconds anæsthesia followed, against fifty-three with gas and air, and fifty with gas and oxygen. The exhilaration after gas contrasted with the dazed condition after gas and air. The gas and air administration was this time shorter than the gas and oxygen, and the snoring was later in appearing than with gas alone. With gas and oxygen the snoring did not appear at all, but at fifty-five seconds the "distant stertor" occurred, and doubtless lasted until the end of the administration. There was certainly fifty seconds anæsthesia.

With reference to the symptoms at the height of anæsthesia, with pure gas they had what was best described as the sleep-like condition. The relative merits of gas, and gas and oxygen were well known. In his opinion gas and air held the intermediate position, and he claimed for it the great advantage of a long anæsthesia, and further, it required no special apparatus. The disadvantages of gas and air were the noise and movement, though if the gas were given pure for the first part of the inhalation this disadvantage scarcely existed. Personally he used gas and oxygen in preference to either gas and air or gas alone, but where gas and oxygen was not available, he was convinced that a little air towards the close of the administration would greatly improve the results.

Dr. HEWITT felt that Mr. Rowell had put the matter so very clearly before the Society that there was little left to be said. His first remarks Dr. Hewitt considered of very great interest, because they showed that by prolonging the administration of nitrous oxide a longer anæsthesia resulted. He hoped that Mr. Rowell would see his way to continue the comparison of cases, for if he could get two hundred or three hundred together there would then be some distinct lines to go on, but even from what he had already said, the relative advantages of the three methods were distinctly apparent. With regard to the use of air and nitrous oxide, he had had very little experience of it because he preferred to use oxygen and nitrous oxide in combination, but he quite believed with Mr. Rowell that the use of air with nitrous oxide was better than using nitrous oxide alone, and he thought it only inferior to oxygen because one could not get the depth of anæsthesia, and there was also the likelihood of over-stepping the boundary by giving either too much or too

little gas. There was one question he would like to ask Mr. Rowell, *viz.*:—what the after effects were? There was, as members of the Society would be aware, one slight disadvantage connected with the use of oxygen, a disadvantage which he never lost an opportunity of pointing out, *viz.*:—that after prolonging the administration to such an extent as was possible when oxygen was used in considerable proportions there was a much greater tendency to nausea, than even when nitrous oxide was used alone, more particularly in boys of thirteen or fourteen years of age. He should like to know whether the prolonged administration of nitrous oxide, when air was added to it, was also likely to lead to this after effect. He thought this question of after effect was of considerable importance when discussing the different methods of producing anæsthesia. The use of air with nitrous oxide lessens stertor and jactitation, but with little children he thought the use of oxygen was far preferable, because it was impossible to graduate the admission of air to anything like the same extent that could be done when using oxygen, for that reason he thought that the use of air was inferior for young children.

Mr. EDMUND OWEN read a paper on the "Treatment of Carious Milk Teeth." Speaking as a general surgeon, he did not consider himself competent to indicate to a society of specialists what was the right course to pursue in connection with the carious teeth of children, but he proposed to place before them a few thoughts on the subject from his own point of view. He would, in the first place, ask whether they were quite sure that their treatment of carious molars in children was sound and right, that is to say, were they convinced that the insertion of a filling was the best method of treatment for the average carious molar of the average child? To reply that the filling of the child's tooth was the result of evolving science, and, therefore, a distinct advance on the old treatment of extraction, was simply begging the question. The adoption of novel and apparently scientific methods did not necessarily imply advance. The evolution of science, falsely so called, had recently in at least two conspicuous instances put back the dial of general surgery, so that at the present day the boy with a vesical calculus and the man with a popliteal aneurysm did not stand nearly as good a chance of recovery as they would have done twenty years ago. Advanced treatment was not always progress in general surgery,

though it was possible that those he was addressing might be under the impression that dental surgery was constantly advancing. Could it be demonstrated that the comparatively modern method of treatment of carious milk teeth was unmistakable progress? While he was not prepared to go the length of saying that in no circumstances should carious milk teeth be conservatively treated, he was, nevertheless, inclined to the opinion that this treatment was carried too far. In seeking for a reason why the dental surgeon was so evidently disinclined to extract an offending tooth, he had come to the conclusion that it was possibly owing to a fear which overshadowed him lest its removal should prevent the due development of the maxillary arch. To this he would reply by the question, Did the developing jaw depend for its perfect evolution upon the presence of carious teeth in its alveolar process rather than upon the dental sacs enclosed within its base? Personally he would regard it as possible that if everyone of the temporary teeth were extracted soon after eruption, the basilar process and the jaw would attain their normal size and shape in due course. Again he would ask, Was the dentist afraid that if the milk molars were removed the bicuspid and the permanent molars might, so to speak, have to scramble for their places with the risk of not finding room, and that the first permanent molar would especially be impeded in its eruption and would become awkward and unruly? Again he would reply if the permanent teeth were going to crowd up in such an illmannered fashion simply because some carious and harmful milk teeth had been extracted, surely the dental surgeon could watch and weed them if there be not eventually room for them all. He did not think that this would be faulty dental surgery, but then it necessitated prolonged supervision over the child. Undoubtedly the most satisfactory course would be to make the environments of the child such that the temporary teeth should not become at any time the happy hunting ground of septic micro-organisms, but remained sound and useful tissues until the permanent teeth were ready to take their place. He would strongly advocate that more attention should be paid to the importance of children's mouths undergoing regular periodical inspection; with half a glance the surgeon then saw what was wrong, and had comparatively little difficulty in putting it right. If dental defects and irregularities were allowed to drift on undetected and uncorrected, it was often

beyond the dental surgeon's power to remedy them at a later period. It would be very desirable, in his opinion, that the Medical Council should require that everyone entering upon the practice of general surgery should possess at least a rudimentary knowledge of the anatomy, physiology, and pathology of the teeth, and, inasmuch as he had been so bold as to bring a paper before gentlemen practising dental surgery, would not one of them offer *en revanche* to lay their views upon some common subject before one of the general medical societies? Turning from the general consideration of the question before them to the particular, he would put to them a suppositious case. Supposing a boy of five years with a carious lower molar, which began to go wrong after a severe attack of measles; he was afraid to eat upon that side, and the tooth looked so unpromising that the dental surgeon, to whom he was at length brought, was disinclined to place in it even a temporary filling. The boy had severe attacks of toothache, and the lymphatic gland below the angle of the jaw was already enlarged and tender. Why should not the dental surgeon promptly extract the tooth? He (Mr. Owen) was sure he ought to do so, as its removal might prevent the child becoming the subject of cervical abscess, for septic micro-organisms were already finding their way from the pulp cavity to the associated lymphatic gland. Why should the dentist decline to extract? Was it because he foresaw some possible contingency from the eruption of the permanent tooth? But in any case could he in the meantime ensure the child against secondary glandular abscess in the neck? If he could not, would it not seem that his temporising was unsurgical and dangerous? Take another case not so far advanced, *viz.*, that of a carious patch in the crown of the second molar of a boy of eight; he had had severe toothache, and the gland was tender below the jaw; the wall of the tooth was healthy looking and strong. What would the dentist do for him? He would examine the tooth, the pulp was exposed and exquisitely tender, he would devitalise it, shape down the cavity, and bring down the soft tissue from the root of the fang by a Donaldson bristle. Had any of his audience had a Donaldson bristle passed up the fang of one of their own teeth? He had, and he could assure them that no child could stand the ordeal twice; but unfortunately a molar has more than one fang, and unless each fang has been thoroughly cleaned out, filling the cavity was merely

rolling a stone over the mouth of a whited sepulchre. In such a case future trouble was almost inevitable; the very germs with which the dental surgeon temporised in the alveolar region would subsequently be encountered by the general surgeon in the supermaxillary glandular abscess of this boy. In Messrs. Smale and Colyer's recent book this passage occurred: "It is also recommended by some in place of filling the cavity to cap it and perform rhizodontomy." Though Messrs. Smale and Colyer did not themselves advocate this plan, neither did they condemn it. But what was it but to convert the pulp cavity into a natural incubator? Messrs. Smale and Colyer thoroughly realised the great danger of these germs passing through the apex of the root, but they had not attempted to deal with the difficulty. Carious micro-organisms were often the cause of great distress to children, and were always a dangerous source of septic infection of the cervical lymphatic glands. Unless the carious patch was slight and superficial it could not be rendered absolutely aseptic, as children could not tolerate the pain, manipulation, and strain which were needed for that purpose. The development of the jaw depended upon the presence of the dental sacs of the permanent rather than upon that of the milk teeth. To increase the happiness of children, and to diminish the risk of glandular infection and abscess, the best treatment for the general run of carious milk molars was extraction.

Mr. F. J. BENNETT did not think that their position had been materially assailed by the paper. He would first point out the conclusion that they would most of them come to, that undoubtedly the permanent teeth were materially injured as regards crowding by the premature extraction of the temporary teeth whether carious or not. That was a question which had often been fought out by measurements of models of all descriptions by Mr. Tomes and others whose names carried great weight. There were also specimens in their museum showing that the permanent teeth were held back by the premature removal of the temporary ones. If one temporary tooth were taken out, say in the bicuspid region, the first molar and the first bicuspid might so come together as to quite prevent the second bicuspid erupting at all. As to destroying the pulps of children, when that became necessary he did not think that any member of the Society, or any good dentist, would retain the temporary teeth after the lymphatic glands had enlarged.

Another point to which Mr. Owen did not allude was the evil effects of carious temporary teeth when they go so far as to develop alveolar abscess. With regard to exposed and inflamed pulp of children's teeth, the acute pain spoken of in adult teeth was not quite so bad in children, and therefore the application either of a minute quantity of arsenical fibre or strong carbolic acid would often stop the pain without doing much damage.

Mr. CHARTERS WHITE thought it very desirable, both for the digestion and for the comfort of children that the temporary teeth should be retained when possible. There was one point for which they ought to thank Mr. Owen for calling attention to, *viz.*, as to the difficulty of getting constant supervision of the teeth of children from the ages of five to eight. He did not believe in putting arsenical paste into the temporary molars of a child. The pulp of a temporary tooth being large, it often communicated with the gum beneath, with the result that a good deal of ulceration would be produced.

Mr. GEORGE CUNNINGHAM regarded the paper as not only valuable to dentists but also to medical men. With respect to the advisability of the Medical Council making it compulsory upon medical men to know something of the anatomy, physiology, and pathology of the teeth, he heartily agreed with the suggestion. Mr. Owen had recommended an interchange of missionary effort between the medical and dental professions; advances, however, had been made by the latter body but had been somewhat coldly rejected by the former. Commenting on the cases brought forward by Mr. Owen, he did not think anyone would go in for elaborate treatment of the carious milk molar when it was complicated with swelling in the cervical glands. While the prevention of overcrowding was an important factor as to the extraction or retention of the temporary teeth, it was not the most important. He would prefer to lay stress upon the fact that the molars were given to the child to be used, and if he was robbed of them the natural function of mastication would be interfered with. As to periodical inspection, he believed the great point was to encourage the bringing of children earlier to the dentist; they should come from the age of two or three years, and the confidence of the child should be won so that instead of looking forward to the visit to the dentist with dread or horror he should do so with pleasure. With regard to rhizodon-

topy, the sooner that operation was wiped out of dental practice the better. The olfactory test for the septic condition of a root canal he thought was certainly very unscientific. Mr. Owen had said that children would be happier if there were more extractions ; on the contrary, he (Mr. Cunningham) thought it was bad enough in the case of an adult, but far worse for a child when its teeth had to be taken out prematurely. There was one point in the treatment of temporary teeth in the early stage of decay which had not been sufficiently practised ; it was well known that the reason that teeth decayed so much was because of congenital defects in the crevices of the molars. He had found it a good practice to fill such teeth even before there was such a cavity as to make it desirable to use the dental engine ; when they found deep crevices in the molars wherein food could lodge it was well to fill them as a preventive.

Mr. SIDNEY SPOKES had anticipated that reference would have been made by Mr. Owen when alluding to the swollen cervical gland to that which was even more serious than the ordinary septic infection, *viz.*, the entrance of the bacillus of tubercle into the organism of the child. This might have been adduced as an additional reason why carious molars should not be neglected. The point of importance with respect to the abstraction of the temporary molar and its influence upon the permanent molar was the period at which the extraction took place. His own belief was that the subsequent development of the jaw would not be influenced by the extraction ; indeed, he would go further back and say that the child inherited a certain development of jaw, and so long as the needful amount of nutrition was kept up the child would maintain that development. While advocating symmetrical extraction of permanent teeth he was opposed to symmetrical extraction of the temporary molars. He had distinct notes of cases in which the second upper temporary molar was perfectly sound and strong and the lower temporary molar had been extracted, the result being that the first permanent molar had been unable to come forward owing to interlocking in the articulation.

Mr. J. F. COLYER said that he was particularly interested in the treatment of children's teeth, and therefore thanked Mr. Owen for bringing the subject forward, but thought that he had dealt with it in too pessimistic a spirit. He recommended consultation between the general and dental practitioner where tuberculous glands in

children were discovered by either of them. Not unfrequently these glands were ascribed to the condition of certain temporary teeth, when careful examination would show them to be due to other lesions about the patient. In private practice he had not during the last four years had a single case of swollen glands due to a carious tooth. In hospital practice they were doubtless more often met with, and in that event he did not hesitate to adopt extraction. He had for a long time believed that the tubercle bacillus effected an entry through dead carious molars, and where there was a tendency to glandular enlargement about the neck he should extract the tooth; on the other hand, if the child was otherwise perfectly healthy, he should save the tooth. Mr. Owen had referred to a case of a temporary molar with an exposed nerve and tender gland under the jaw, but he (Mr. Colyer) had always understood that there were no lymphatics in the nerve; how, then, did the exposed nerve cause a diseased gland under the jaw? With respect to arsenical paste, it was constantly being said that it should not be used, but he failed to see why, providing it was not left too long in the tooth. Mr. Cunningham had said that, relying upon the freedom from odour, or otherwise, of the pulp was an unscientific method, but he (Mr. Colyer) knew of none other. What scientific method would Mr. Cunningham use? Then, again, as to rhizodontology, there were instances in which it was impossible to get the canal clear; in such a case he regarded the operation as perfectly justifiable, and did not at all hesitate to confess that under such conditions he performed it. There was one point which had not been referred to, but which he considered the principal cause of tuberculous glands. In his opinion they were not due so much to the carious temporary molar as to the first permanent molar. In conclusion, he was in favour of every available means being adopted to save the teeth of children. If the work were done thoroughly, if the nerve were killed and the pulp canal in an aseptic condition, they would save the teeth of children without any ill results in the lymphatic glands.

Mr. STORER BENNETT thought it would be agreed that they had listened to a very amusing paper. Mr. Owen had come as a visitor to give his opinion, but he was quite confident that if he expressed those opinions before the Examining Board they would not be accepted. There was hardly a statement which Mr. Owen had

made that was not capable of being challenged. Mr. Owen attributed to them the belief that the jaw would not develop after the temporary molars were extracted, but that was a view which had long since been abandoned. He, secondly, stated that they were afraid of clearing out the temporary molars because crowding and jamming of the permanent teeth would result. Of course, Mr. Owen had not had the same opportunities of seeing and treating irregularities of permanent teeth as most members of the Society had, or he would have spoken quite differently upon this point. As an instance of somewhat peculiar pathology, Mr. Owen had spoken of the extraction of a tooth with swelling at the roots and tenderness about the gum. The patient he described was certainly not suffering from caries only; the chief symptoms were those of periostitis, a different kind of symptoms altogether. The reader of the paper had thrown aspersions on the care of the average dentist in stating that swellings under the jaw were allowed to pass unnoticed. To pass the hand under the jaw was a matter of routine with them, and he was sure that the average dentist was a far more careful man, and far more experienced in his special work than Mr. Owen gave him credit for. No doubt Mr. Owen wished to emphasize the importance of not allowing any source of infection to the cervical glands to exist. While they were greatly indebted to Mr. Owen for bringing forward this very interesting subject, he nevertheless thought it would not be fair to allow the paper to pass without criticism.

Mr. W. B. PATERSON thought the discussion had taken an unnecessarily serious turn. Mr. Owen had himself given the key to his position when in his paper he had stated that with timely and periodical inspection of the temporary teeth dangers to which he had alluded might be guarded against. Speaking of the references that had been made to Messrs. Smale and Colyer's book, Mr. Paterson could not help thinking, from his recollection of it, that there was some qualifying statement with regard to the treatment of the temporary teeth which had not been quoted.

Mr. BLAND SUTTON, speaking as a general surgeon, referred to his early association with Middlesex Hospital, and said that when he first became assistant-surgeon in charge of the out-patient department he used to consult with his dental colleagues as to the advisability of extracting teeth when children had enlarged glands,

but they used to tell him that it was not the teeth that caused the glands but something else. Before he grew wiser he doubted the correctness of their opinion, and was rash enough to take matters into his own hands by pulling the teeth out himself, but later he learnt more discretion and began to feel that his dental colleagues were right ; and for this reason, that when the glands had enlarged the mischief was done, and although the tooth was extracted they had to subsequently enucleate the gland under the jaw. It was a point for Mr. Owen to consider, whether when a tooth was extracted in anything like a majority of cases the swelling of the glands subsided ; in his (Mr. Bland Sutton's) experience they did not. A good deal had been said about making the general practitioner very wise about the teeth, but he did not think it was desirable. In his opinion the general practitioner was already overburdened ; he was expected to know all about the eye, the skin, and a variety of other matters, and he thought he should not be too much pressed about the teeth,

Mr. OWEN replied at some length, and, the usual vote of thanks having been passed, the Society adjourned until November next.

STUDENTS' SOCIETY, DENTAL HOSPITAL OF LONDON.

THE ORDINARY GENERAL MEETING, held Monday, May 21st, 1894, the President, A. E. CLAYTON WOODHOUSE, Esq., in the Chair. The minutes of the previous meeting were read and confirmed. Messrs. S. A. Knaggs, C. Lush and F. J. Padgett, signed the obligation book and were admitted members by the President.

The PRESIDENT asked the members to elect Mr. N. G. Bennett, who had been nominated by the Council as second years' Councillor in place of Mr. J. Main Nicol, resigned.

Mr. N. G. Bennett was elected unanimously.

On Casual Communications being called for, Mr. A. B. DENSHAM presented two models, *one* of the upper jaw showing transposition of the canine tooth which occupied a place between the two bicusps, the patient was a girl aged 19; *the other* of an antral cyst, in connection with the upper jaw, the patient was a man aged 26, in whom the second molar on the affected side was extracted, being loose, but as there was no discharge the only remaining root of the first molar

was removed, a flow of thin yellowish fluid with crystals of cholesterin followed, the cavity was then washed out with tinct. iodine and packed. After being treated for a fortnight there was no discharge whatever on removal of the list, so that the case might be considered cured.

Mr. G. NORTHCROFT presented the Society with three pairs of pliers, designed by him for special purposes—bending up steel wire in regulation plates—holding teeth after being backed—punching metal caps to be used when applying arsenious acid.

Mr. D. P. GABELL remarked that he had found the pliers for bending up regulation springs of very great service during his time in charge of the Regulation Room.

Mr. W. S. HOLFORD showed a model of the mouth of a boy, aged 9 years, in which both upper centrals had been broken off, leaving the pulps hanging out, he had applied arsenious acid to both, and found on extracting the nerve, that in the case of one, the apex was closed, but in the the other, open; he would like to hear the opinion of some of the members present about the treatment.

The PRESIDENT said that he objected to keeping dead teeth in the mouths of children, especially where there was any tendency to crowding, but as in this case there was not, he should advise the pivoting of them at some future time.

Mr. J. MAIN NICOL said he preferred in such cases to administer gas and extract the pulps rather than apply a dressing, owing to the difficulty he had found in retaining it in place.

Mr. T. H. CLARENCE said, that if both teeth were extracted the space left was too large to hope that the laterals would fill it up, it therefore became a question as to what age the roots after being filled and the edges smoothed off should be pivoted, he advocated leaving them till the patient was 15 to 16 years of age so that

Mr. NORTHCROFT endorsed Mr. Clarence's remarks, but was of opinion that the pivoting might be left a few years later with advantage and also that the average time a pivot lasted was somewhat longer than Mr. Clarence led the members to believe.

The PRESIDENT on being asked the life of a pivot, said, he had seen many that had been put in ten years ago which now looked as well as ever.

Mr. H. W. NORMAN presented the Society with a specimen of an odontome in connection with an upper canine of a girl, aged 15.

The case was interesting from the fact that two years previously the patient came to the Hospital complaining of pain in the region of the canine, which was as yet unerupted. A crucial incision was made and the girl did not come back for two years, when she was seen in the gas room and it was found that the tip of the canine was just showing through the gum, and according to the patient, had been in the same position for nearly two years. Mr. Matheson feeling confident that something was radically wrong with it advised its removal.

Mr. MOSELY presented a wax model of the upper jaw, showing malposition of one central—a year ago the other central being quite loose was removed—the present age of the patient was $5\frac{1}{2}$ years.

The PRESIDENT then called upon Mr. H. W. Norman for his paper on "Dental Education." (See page 305.)

The PRESIDENT said that training of the hand in the workshop was exceedingly beneficial, and he would advise members new to their work not to use their engines too much, but rather their hand instruments as by that means greater steadiness of the hand would be acquired. As regards what had been said about the administration of gas, most practitioners in London employed anæsthetists, but certainly to members intending to practise in the provinces, a practical course of anæsthetics would be of great service.

Mr. G. NORTHCROFT thanked the reader for his interesting paper, and said that the mechanical training of the dental student had called forth a great deal of discussion at the late Newcastle Meeting. As in operating work, a man endeavoured to become efficient in the many methods of gold filling, so in mechanical dentistry he ought to try and learn the various different ways of working. The ideal workshop of Mr. Norman was not practicable in his opinion, as at a certain time when the senior pupil left, either the work would be badly done for a time by the next pupil, or else the practitioner himself would have to do it. He thought that as every dental student had at his General Hospital to see a great many operations which he would never dream of performing, it would be better in place of them to instruct him in the emergencies which might occur during the administration of nitrous oxide.

Mr. DODD in the course of his remarks urged the importance of replacing part of the three years' articles by a course of mechanical dentistry under some responsible central body, such as might be found at the various Dental Hospitals. He thought that the pupil

was often too much at the mercy of the mechanic, someone had said that at such an institution as had just been mentioned, the student might tend to become a "jack of all trades," he thought this preferable to being a "jack of one," which often resulted from the present system of private apprenticeship. He also urged the students to help one another, and said he feared there was sometimes to be found in Hospital Schools an aristocracy of learning whose members were quite as exclusive in their habits as those of the better known class in the outside world, viz :—The Aristocracy of Wealth.

He then stated that the need of special classes in anæsthetics, was a fancied rather than a real one, for he knew that many of the anæsthetists were now most willing to give the necessary practice to anyone who would ask them. He thought that success in examinations could not be entirely brought about by regulations or classes, or so called "guides," but that it depended more upon the energy tack and system possessed by the student. Many too did not think that the taking of the M.R.C.S. materially interfered with the dental work, for what it meant in many cases was this: that instead of spending the evenings of the first year or eighteen months in places of amusement as many did, they were devoted to that entire work required by the conjoint examinations. If men aimed at higher examinations, it more often meant that the extra work was super-added and not that the normal work was neglected. He believed that the harder work required of those who took a double qualification was of value to them, not only for the sake of the learning, itself, but also because its performance implanted in them studious, careful and observant habits which would be of value to them throughout all their lives and especially in making them successful practitioners.

Mr. W. P. GABELL said he was glad to note Mr. Dodd's desire to speak, it was one of the objects of the Society, and he trusted that other members would also speak. He emphatically denied Mr. Dodd's accusations of want of sympathy and aid between the senior and junior students, the students of our hospital were certainly not guilty of such lack of courtesy and kindness. He thought that in the present mechanical system that the pupil often had himself to blame. As regards the half courses of medicine and surgery, he thought it was a pity that a special course of the general principles with typical examples in explanation was not given to dental

students ; and in respect to teaching in anæsthetics, dental students were in the same position then as medicals, and were just as free to take a course of lectures in the subject if they liked.

Mr. PADGETT, after remarking that he had had the good fortune to have spent seven years at mechanical work, instanced what good service the evening lectures given by the City Guilds had done to improve various mechanical works, and said that something of the same kind with reference to dental mechanics might be done with advantage.

Mr. S. COLYER then read a few statistics, tending to prove that the students who took the conjoint examinations, were, judging from the number of prizes taken by them during the last ten years, more successful than those taking only the L.D.S.

Mr. J. MAIN NICOL, after congratulating the author of the paper on the masterly and yet moderate way in which he had handled his subject, briefly expressed his opinion of a pre-curricular examination in dental mechanics, thinking it, if sanctioned by and under the control of the examining board an excellent addition to the existing system. He appealed to all the members present that Mr. S. Colyer's statistics were scarcely fair, as the multiplication of percentages for comparison, though a very simple, was an equally fallacious method, and took no account of many factors which might modify the figures exceedingly. Because out of x men with certain qualifications, y men obtained a particular distinction, it did not necessarily, and indeed very seldom did follow that among $4x$ similarly qualified individuals, $4y$ would obtain it. With regards to the instruction in the administration of nitrous oxide, Mr. Nicol was fully in sympathy, as in many parts of the country it was impossible to obtain the skilled assistance of an expert anæsthetist, and he thought that until this difficulty were overcome, the anæsthetist staff of the hospital were in duty bound, and he felt sure would be most pleased to teach men the use of nitrous oxide, and to afford them opportunities of becoming personally familiar with its exhibition. He did not consider that a rule to make such instruction compulsory was required, seeing that a dental student had the same opportunities of taking out lectures on the subject as a general student, and the practical acquaintance was a mere question of asking permission. Lastly, he could not refrain, even at the risk of seeming grandly paternal from reminding members, especially the younger ones, that

they were not preparing for examinations so much as for future practice, and that if they equipped themselves thoroughly for the latter, they would have little difficulty with the former. At the hospital, of which they were all proud to be students, they would have almost unprecedented opportunities, if they wished, of practising any special branch of operative or mechanical work, and making themselves proficient in whatever work they found most troublesome. He could not sit down without emphasizing very strongly his feeling that men should forget the rigidity of the regulations, and not always be thinking of getting "signed up," but take every opportunity of themselves treating every variety of case, so that when they left the hospital they could scarcely see a patient, the condition of whose mouth had one if not many parallels in their past experience.

Mr. W. S. HOLFORD, after complimenting the reader on his paper, said that the pupil system had in his opinion, many good points. A year's work at some central institute might be, indeed, very likely would be of great service after two years in some private workshop. He strongly advocated that men taking the conjoint should do so before they commenced their dental hospital work, and also that when they had obtained their L.D.S., they should endeavour to obtain a house surgeoncy, as by this they learnt how to treat cases very much better.

Mr. A. B. DENSHAM congratulated Mr. Norman on the excellent way in which he had expressed his views on Dental Education and thought that Mr. Nicol had very clearly given the advantage of a thorough medical education. In his opinion, the training necessary for the membership was of great value in educating the faculties of observation; as an all-round view of the necessities of each individual case in dental practice is quite as important as the perfect filling of individual carious cavities. He advised men taking the membership to pass their second college at least before entering the Dental Hospital.

Mr. N. G. BENNETT criticised Mr. Densham's remarks regarding the advisability of passing the second examination before entering the Dental Hospital. Although it was perfectly true that the afternoons at a general hospital were generally sufficient for gaining knowledge and clinical experience, yet he thought that it was extremely difficult to fulfil the duties of dresser and clerk contemporaneously

with spending a sufficient time at the Dental Hospital. He pointed out how the usual system of finishing the special work first and then proceeding to the general, medical and surgical work was entirely at variance with the method adopted, in the pursuit of other branches of special surgical knowledge, and would prefer if entering the two hospitals together to attempt the first and second examinations before proceeding to the examination for the L.D.S.

Mr. F. BREESE said he should like to ask one of the speakers (Mr. S. Colyer) whether he tried to make out that a man with the double qualification was a better dentist than one with only the one qualification.

Mr. NORMAN then replied as follows: In answer to Mr. Northcroft, who I fear misunderstood me, when he said, that I advocated learning only one method, I really said that the pupil should master one method first, when others would afterwards be more easily learnt. With regard to the gas question, I was not aware that the anæsthetists would allow a senior student to administer, with the exception of Mr. Nicol. Mr. Gabell would like to see a course for dental students, touching only on the principles of surgery. I think that such a course would be hardly sufficient. A gentleman also spoke to some length about having evening classes at the Mechanical Institute, comparing it with the Guilds' Technical Institute. I did not at all infer that there should be evening classes, in fact, would greatly object to it. With regard to Mr. Colyer's statistics, I think it was hardly fair, because although not a membership man myself, still I do most thoroughly agree with it, as evidenced by my paper, and so consider that the statistics were quite uncalled for. I can hardly see how Mr. Densham could manage to spend every morning at the Dental Hospital and at same time having his membership work to do. Allow me to thank you for your kind attention and also for so splendid a discussion, which I feel has abundantly made up for so poor a paper.

Vote of thanks having been accorded to Mr. Norman for his paper and to those gentlemen who had brought forward the Casual Communications, the President announced that a Microscopical Demonstration would be held later on in the session, and that the next Meeting of the Society would take place on October, 8th, when Mr. N. G. Bennett will read a paper on "Micro organisms."

The proceedings then terminated.

THE DENTAL RECORD, LONDON: JULY 2 1894.

A GUINEA FOR HALF-AN-HOUR.

DISPUTES between members of the dental profession and their patients, relative to the non-payment of fees, do not usually fall within the scope of those matters on which we neither care to dwell, nor to offer the publicity which our columns afford. More often than not these cases are of purely personal interest, and it is but rarely that the judgments given aid the solution of the vexed question of fees. There must always be some difficulty surrounding such a question, for even if we establish a sort of legal tariff for dental operations, it is quite evident that no hard and fast lines could be laid down on which this "list of prices" can be based. The most obvious guidance would be to take the time each operation occupied, but even here the ability of different operators and the speed at which they work will vary much. Even if we admit this difference and have, not one, but several scales of fees, we have again to determine who or what shall guide us as to which of these we are entitled to select. In the case, *Coffin v. Vavasour*, which will be found reported on another page, the learned judge stated that he regarded a guinea per half-hour as a perfectly proper fee for a high-class dentist to ask, and this seems to have guided him in giving a verdict for the plaintiff. In forming this view he was undoubtedly influenced by what is the prevailing custom of the day. It is recognized that a guinea for half-an-hour's work is a fit and proper fee for one to ask who occupies some eminence in his profession, and who is probably encumbered with the high expenses incident to practising in that quarter of the town, to which alone those will go, who are in the habit of seeking his advice. If, even for the sake of argument, we accept this as granted, we would ask whether professional etiquette would oblige one

of the younger members, who may be just entering practice, to ask the same fees or whether he may ask less till his time be fairly occupied, raising them later as his time becomes fully occupied? If he does the one he lays himself open to the reproach that he is underselling his neighbour, and perhaps, friend, and should he follow the latter course he is probably offering in return less of that experience and skill which time teaches to all. These thoughts show a few of the difficulties in coming to some unity of action in the matter of charges, though much there is that might be urged in its favour. It seems to us a subject that might well occupy the attention of one of our Society gatherings, for the moral weight of opinions so expressed and of resolutions there passed, could not but be useful as a guide to numbers of our own ranks, and to which attention could be called in cases of doubt.

News and Notes.

HOPSON, MONTAGU F., L.D.S.Eng., has been appointed Dental Surgeon to the Hampstead Hospital.

GLASSINGTON, CHARLES W., M.R.C.S., L.D.S.Edin., has been appointed Dental Surgeon to the Westminster Hospital vice Lloyd Williams, M.R.C.S., L.R.C.P., L.D.S.Eng., resigned.

A BRITISH Committee, of which Sir Douglas Galton, K.C.B., F.R.S., is the Chairman, and Professor W. H. Corfield, M.A., M.D. (Oxon.), is the Treasurer, has been formed to further the interests in this country of the Eighth International Congress of Hygiene and Demography, which is to be held in Budapest, from the 1st to the 8th of September this year. Any information may be obtained about the Congress from the Hon. Secretary, Dr. Paul F. Moline, 42, Walton Street, Chelsea, S.W.

AT Lancaster, on June 9th, Robert Knowles, chemist, of Morecambe, was summoned at the instance of the British Dental Association, for practising as a dentist at Morecambe, without being

registered. Mr. Knowles took over the business of Mr. Cutts, dentist, recently, and in his windows was an advertisement "Teeth extracted." On the floor was a mat with the word "Dentist" upon it, which word was still legible, though the mat was turned wrong side up. Defendant also inserted advertisements in a local paper calling attention to the dental portion of his business, but omitting all reference to his chemist's business. The defence was that there was no intention to break the law, that defendant had taken down all references to surgeon-dentistry which his predecessor exhibited, that he had a perfect right to extract teeth and manufacture false ones if anyone would employ him, and that the word "dentist" was practically illegible when it was put the wrong side up. After a long hearing the magistrates convicted, inflicting a penalty of £1 and 12s. 6d. costs.

At the last meeting of the Council of the Royal College of Surgeons England, the following gentlemen, having passed the necessary examinations, were admitted Licentiates in Dental Surgery:—Allworth, Alfred Leigh, M.R.C.S.Eng., Guy's Hospital, and National Dental Hospital. Barrett, Charles, Charing Cross and National Dental Hospitals. Britten, Arthur, Mason's College and Dental Hospital, Birmingham. Constant, Frederick Charles, Guy's Hospital. Davison, Thomas Stockil, Guy's Hospital. Dodson, Arthur Ranken, Charing Cross and Dental Hospitals. Farmer, Francis Mark, Middlesex and National Dental Hospitals. Flintan, Francis Robert, Charing Cross and Dental Hospitals. Halliday, Harold David, Middlesex and Dental Hospitals. Harding, Henry Paxton, Royal Infirmary and Dental Hospital, Liverpool. Henry, Percy Francklin, Guy's Hospital. Holden, Allen, Owen's College and Victoria Dental Hospital, Manchester. Hills, William Ernest, Guy's Hospital. Huckle, Arthur Henry Headley, Guy's Hospital. Humphreys, Harold Francis, Guy's and Dental Hospitals. Jones, George Wilcox, Guy's Hospital. Lees, James Adam, Owen's College and Victoria Dental Hospital, Manchester. McFarlane, John Scott, Charing Cross and National Dental Hospitals. Mackley, Ernest Hubert Alborough, Middlesex and Dental Hospitals. Miller, Quintin Herbert, Charing Cross and Dental Hospitals. Moore, George Peirce, M.B.Dub., Trinity College and

Dental Hospital, Dublin, and National Dental Hospital. Musgrave, Gilbert Mordaunt, Guy's Hospital. Nicholls, Reginald Edward, Charing Cross and National Dental Hospitals. Nichol, James Main, M.R.C.S.Eng., Yorkshire College, Leeds, and Dental Hospital. Pare, John William, M.D.Edin., Edinburgh University and Guy's Hospital. Park, William Hodgson, Charing Cross and Dental Hospitals. Peake, George Arthur, M.R.C.S.Eng., Royal Infirmary, Dental Department, Bristol. Pilcher, William Henry, Guy's Hospital. Prideaux, Henry Symes, Charing Cross and Dental Hospitals. Reeve, Harry George Cleave, Middlesex and Dental Hospitals. Rispin, William, Charing Cross and Dental Hospitals. Robinson, George Edward James Antoine, the University and Dental Hospital, Dublin. Sibson, Arthur Bertram, Owen's College and Victoria Dental Hospital, Manchester. Snape, Joseph, University College and Dental Hospital, Liverpool. Soper, Frank Arthur, Middlesex and Dental Hospitals. Taylor, Edwin Henry Pascal, Middlesex and Dental Hospitals. Thornton, Robert, Guy's Hospital. Trewby, Henry William, Middlesex and Dental Hospitals. Tyrrell, Albert John, Guy's Hospital. Van der Pant, Horace William, Charing Cross and Dental Hospitals. Willis, George Nicholls, Guy's Hospital. Young, Ernest Edward, Charing Cross and Dental Hospitals. Twenty-four candidates were referred back to their professional studies.

Two prosecutions, instituted by the British Dental Association, were heard by Mr. F. J. Headlam, at the City Police-court, on June 8th. James M'Donald, of 29, Piccadilly, was summoned for using the words "dentist" and "dentorium," he being an unqualified person and not entitled to do so. Mr. Turner, barrister, London, appeared for the prosecution, and Mr. W. Cobbett represented the defendant. Mr. Turner stated that the two words appeared on the defendant's premises and card many times. Piccadilly, where the premises were situated, was one of the busiest thoroughfares in Manchester. The advertisements were very conspicuous, and calculated to arrest the attention of persons passing them. Though the defendant's card was headed "M'Donald's Free Dentorium," and the word "Dentist" was given as the telegraphic address he knew nothing about dentistry. When he was spoken to the defendant said he did not claim to be a dentist, but with regard

to the words "Dentists' Emporium," he said he had consulted counsel who had said he was entitled to use those words. Mr. Cobbett for the defence, submitted that there was no offence under the Act. The defendant had not held himself out as a dentist. As a matter of fact, the defendant had a qualified dentist in charge of the place, and, therefore, anyone who went there expecting to see a dentist was not deceived. Mr. Headlam expressed the opinion that the offences complained of had been committed. For the use of the word dentorium the defendant would be fined £10; for using the word dentist £5; and he would also have to pay £5 extra costs.

In the other case the defendant was Arthur Lestrangle, 47, Stockport Road, Ardwick, who was summoned for using the words "Ardwick Dental Surgery," in contravention of the Act. When the premises were visited on the 29th May by an agent of the Association, they were found to be so advertised to the public. Defendant then said he was not aware he had been infringing the Act. Since then he had informed the Association that the establishment had been taken over by a qualified man. Mr. Hislop appeared for the defendant, and argued that the use of the words "Dental Surgery" was not an offence. Though not qualified the defendant was an expert in the business. A fine of £5 and costs was imposed.

In the Westminster County Court, on June 14th, a singular application was made to his Honour Judge Lumley Smith, Q.C., in the case of "Mitchell v. Stephens." An action was brought by a dentist for work done and goods supplied in his professional capacity, and plaintiff applied for an order for inspection of the lady's mouth. His Honour, referring to the rules, said he had power to order the inspection of "any property or thing," the subject-matter of the action. Was this lady's mouth property or a thing? "Both, Sir," replied the solicitor. "We want to see the work done, and to have it examined by experts." His Honour did not see his way to make the order asked for, and dismissed the application, reserving the question of costs until the trial of the action.

SOMEHOW or other one always seems to doubt the truth of a funny story. Still, we give the following on the report of the

Zahnärztliche Rundschau. A baker's wife of Mannheim gossiped with her neighbour and laughed exceedingly, so much so, indeed, that her artificial denture wandered down her throat. Homely means for removing them failed, death seemed imminent, she gasped for breath. Hurried into a conveyance, the Jehu drove furiously, and alas ! likewise carelessly, for rounding a corner, he charged the kerb. "It is an ill wind which blows nobody any good," for the shock of impact jerked the denture out of the mouth, causing it to fall at the feet of the half-suffocated "Bäckerin."

THE *Dominion Dental Journal* calls attention to a possible danger to a patient from sitting in a dental chair, *viz.* : ring-worm. The Editor states that he knows of several cases in which patients have contracted ring-worm from contact with a dentist's chair. The head-rest certainly appears a very possible source of infection, and we should all do well to guard against it by covering it over with *clean* napkins.

Invention says that Professor Dewar shows experimentally that indiarubber expands by cold. A piece of rubber tissue is stretched like the head of a drum and cooled locally by the application of a pad wetted with liquid air at 180 deg. below zero C. Whenever touched by the cold pad, the rubber expands into puckers, and as the rubber gets warm these stretch tight again.

IN THE QUEEN'S BENCH DIVISION BEFORE MR. JUSTICE WILLS WITHOUT A JURY. *COFFIN v VAVASOUR*.—An action was brought by Messrs. C. R. Coffin & Sons, practising as dentists at 94, Cornwall Gardens, South Kensington, to recover £38 17s. for services rendered to three members of Sir William Vavasour's family. The defendant did not deny that the services had been rendered, but contested the claim, alleging that the charges were unreasonable, and had been incurred without his authority, and paid £25 into court, which he said was sufficient to satisfy the plaintiff's claim.

Mr. Rawlinson having shortly opened the plaintiff's case, called Mr. Harold L. Coffin, who said: He had an interview with Lady Vavasour about attending her daughters. He attended upon the defendant's daughters from March 7th to April 28th, 1893, and his charges were £38 17s. The charges were according to his usual scale of fees. He sent in an account on May 1st, 1893, and received no answer. He again sent in his account, but received no reply. In September he made another application for payment, and received a reply from Lady Vavasour apologising for the delay. He had never received a complaint as to the unreasonableness of his charges until this action was brought.

Cross-examined by Mr. Bartley Denniss. He had never seen the defendant about the matter. He said his fee was not charged as counsel put it "for filling four teeth and twelve cavities" but generally for the time occupied. The neglected conditions of the teeth required considerable general treatment of the mouth, which he explained, quoting from the daily records in his case book. Two guineas was a fair fee for filling a tooth. One guinea for filling a cavity would not necessarily be sufficient. It would depend upon the amount of time occupied.

Re-examined: He charged one guinea for half-an-hour. He was occupied two-and-a-half hours with one lady for which he charged five guineas, eleven hours with another for which he charged twenty-two guineas, and four and three-quarter hours with another for which he charged nine guineas.

Dr. George Cunningham was called and said: He was lecturer upon Odontology at Cambridge University, and on Operative Dental Surgery at the National Dental College, London, and D.M.D. of Harvard University. He had known the plaintiff for many years as an eminent dental practitioner and was acquainted with his mode of charging. He had gone carefully through the record of the work done and the fees charged by the plaintiff. The plaintiff had the fullest details of treatment in his case book. He thought the charges were fair and reasonable.

Cross-examined: He had not examined the work that the plaintiff had done for the defendant's daughters.

For the defence, Mr. Duncan was called, and said: He was carrying on practise as a dental surgeon in Charles Street, St. James's Square. He had examined the teeth of defendant's daughters in August,

1892, and put them right, for which he charged nine guineas. He again saw them in 1894. There had been a lot of work done upon the teeth, but he could not distinguish what work had been done by the plaintiff, therefore he could not really say whether the fees were reasonable or not. He would have put the mouths in order in 1893 for the same fees as he charged in 1892, if he had been asked to do so. This witness was not cross-examined.

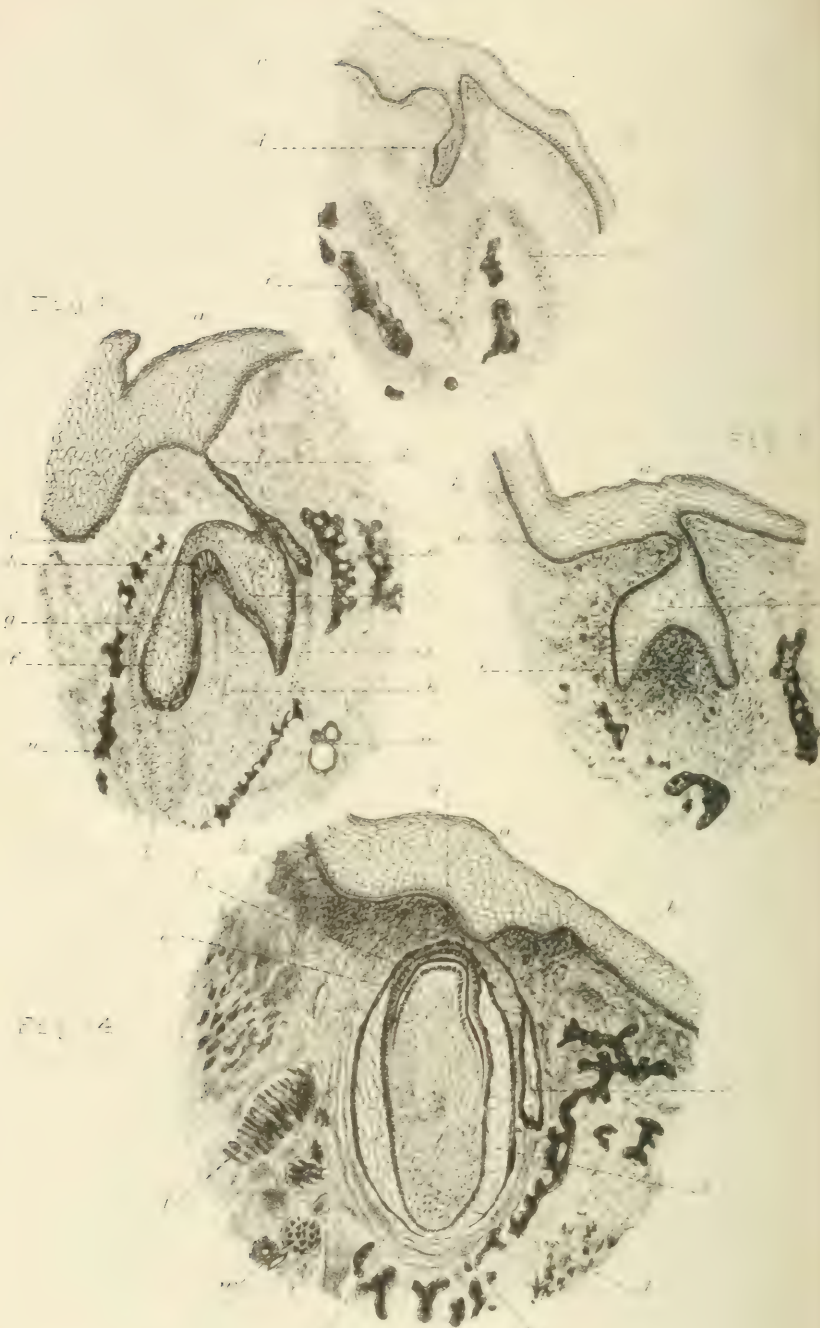
Mr. Bartley Denuiss in summing up the case for the defendant, said, that two guineas for filling a tooth, and one guinea for filling a cavity was ample charge to make. The plaintiff had only filled four teeth and twelve cavities, so that the amount paid into court was more than sufficient.

Mr. Justice Wills without calling upon counsel for the plaintiff, gave judgment for the plaintiff, and said he had had considerable experience in life, and he thought one guinea for half-an-hour was not an extravagant charge for a dentist occupying a high place in the profession. It would never have occurred to him to dispute the claim. With regard to the letters of Lady Vavasour, he held that if a wife takes her daughters to the dentist, who explains what has to be done, the husband cannot complain after the work was done that the wife was not his agent. Nothing can be said against Mr. Coffin, his conduct, or his fees. Dr. Cunningham's evidence on this point seemed conclusive. Mr. Duncan gave his evidence very fairly but it was not very material. He did not think the charges unreasonable and would have paid them himself without the slightest hesitation. He therefore gave judgment for the plaintiff for the amount claimed.

Mr. Rawlinson asked for costs upon the High Court Scale. The plaintiff had obtained an order under Order XIV. empowering him to sign judgment and it was not till then that the defendant obtained leave to defend upon paying £25 into court. "*Barker v. Hempstead*" (23 Q.B.D., 8).

Mr. Bartley Denuiss pointed out that the defendant wished to have the case tried in the County Court, but had been opposed by the plaintiff.

Mr. Justice Wills said: He would be acting within the spirit of the case cited if he made a certificate for costs upon the High Court Scale.



Description of Plate III.

Fig. 1.—This and the accompanying figures are intended to show some of the stages of development of teeth in mammalia. From the embryos of pigs of varying lengths.

First Stage.—Longitudinal section: hardened in perchloride of mercury, or Müller's fluid and alcohol: cut on a microtome: stained hæmatoxylene: 1 inch objective and C ocular: shews (a) oral epithelium: (b) deeper layer of epithelium: (c) Rete Malpighi: (d) primary inflection of enamel germ: (e) commencement of formation of dental sac: (f) bone of jaw.

Fig. 2.—*Second Stage.*—Prepared and cut as above: stained carmine: 1 inch and C ocular: shews (a) oral epithelium: (b) deeper layer of epithelium: (c) Rete Malpighi: (d) stellate reticulum of enamel organ: (e) dentine papilla: (f) bone of jaw.

Fig. 3.—*Third Stage.*—Prepared and cut as above: stained hæmatoxylene: 1 inch and C ocular: shews (a) oral epithelium: (b) deep layer of epithelium: (c) Rete Malpighi: (d) neck of enamel organ: (e) permanent enamel germ: (f) stellate reticulum of enamel organ: (g) external epithelium: (h) internal epithelium: (i) cells of stratum intermedium: (j) dentine papilla: (k) rudimentary blood supply of pulp: (l) formation of dental sac: (m) artery, vein and nerve of jaw: (n) bone of jaw.

Fig. 4.—*Fourth Stage.*—Prepared and cut as above: stained hæmatoxylene: 2 inch and A ocular: shews (a) oral epithelium: (b) neck of enamel organ: (c) permanent enamel germ: (d) dental pulp: (e) layer of odontoblasts: (f) dentine: (g) enamel: (h) ameloblasts: (i) dental sac, inner portion: (j) dental sac, outer portion: (k) stellate reticulum: (l) muscle fasciculi: (m) artery, vein and nerve: (n) bone of jaw.

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Original Communications.

DENTAL MICROSCOPY.*

BY

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M.R.C.S.Eng., L.D.S.Eng.

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(Continued from page 305.)

ON THE PREPARATION OF THE SOFT TISSUES.

THE difficulties attendant on the preparation of the soft dental tissues, for microscopic purposes, differ considerably from those discussed in the last article, and are of quite another nature. Here the great aim is to treat soft and delicate organs in such a manner that their individual cells, fibres, and other important elements, shall undergo no appreciable change in shape or appearance, either by shrinkage, swelling, or *post mortem* disintegration. It is obvious, therefore, that, in the first place, the tissues themselves must be perfectly fresh, and that the action of reagents on them must commence immediately after removal from their living con-

*To Prevent
Shrinkage,
etc.*

*NOTE.—The drawings throughout this work are made for the most part, from original photographs.

dition: it is also clear that the simpler the method of preparation, the better the results: the shorter the time spent on preliminaries, *ceteris paribus*, the truer, and more faithful to nature will be the specimens under the microscope. It would be impossible, with a razor or knife, to satisfactorily cut a piece of soft tissue, the parts of which had not previously been treated and properly prepared: the friable cells and fibres, would, in that case, be broken up and hopelessly destroyed by the movements of the cutter alone. Hence, various reagents have to be employed.

The first steps are concerned with the performance of what are known as the processes of fixing and hardening the tissues. These generally occur simultaneously, but sometimes it is necessary first to fix, and afterwards to harden the specimen. This is done (*e.g.*, in Weil's method,) where mercury perchloride is used for fixing the soft parts, and alcohol for hardening them.

Reagents and their Uses.

Fixing.

Fixing the Tissues.—This means the coagulation of the albumenoids and gelatins of a living tissue, which occurs when it is brought into contact with a certain solution. The coagulating action fixes the delicate elements in the same position that they occupied during life. Many reagents may be used for this purpose, but of these the most useful for dental sections are, mercury, osmic acid, and copper. The first mentioned may be used either as a cold concentrated alcoholic solution of the perchloride, or a 5 per cent. aqueous solution: osmic acid—a 1 per cent. aqueous solution: and a third, saturated aqueous solution of acetate of copper. Alcohol in varying strengths is also an extremely valuable fixing agent. For mere fixing purposes, mercury is the best,

although it leaves behind a troublesome precipitate, which requires removal by iodine. The disadvantages of employing osmic acid are, that it does not penetrate well (because only the external portion of the tissue is affected), that it stains, fixes, and hardens simultaneously, and that the operations have to be conducted in the dark.

Whatever agent has been used, it is most important to remove it thoroughly from the tissues by immersion in alcohol, after complete fixation has taken place.

The "*Hardening*" of a piece of tissue has for its *Hardening.* object the prevention of swelling or other changes in cells when placed in water or the staining solutions; and it gives such great consistency to specimens, that the thinnest possible sections can be cut, and be easily and safely manipulated.

The chief "*hardening*" reagents are, Müller's fluid, alcohol, picric acid, and picric with sulphuric acid when made up according to Fol's formula. Chromic acid, too, is sometimes used, alone or combined with osmic acid. Dr. Weil, of Munich, in his "*Histologie der Zahn Pulpa*," recommends as a useful fluid—a 1 per cent. solution of chromic acid, 100 c.c., with osmic acid (2 per cent. solution), 24 c.c., to which are added, afterwards, 6 c.c. of iced vinegar. "The tissue is then ready in a week." Dr. Sudduth considers that chromic acid alone is best. He uses a 1 per cent. solution, made by adding 30 grains of chromic acid to a quart of water. ("Dental Cosmos," 1884.) *Weil's
Hardening
Fluid*

Of all these, the most useful and satisfactory for ordinary dental purposes are Müller's fluid, and alcohol, the former being especially suited for soft developmental tissues, as well as other structures, the latter for fully-grown specimens.

Müller's Fluid.

Müller's Fluid consists of potassium bichromate 2 parts, sodium sulphate 1 part, and distilled water 100 parts. The salts are generally sold mixed together as a reddish crystalline powder in bottles, and instructions are given for making the solution. If the student, however, wishes to make the solution himself, this can be done by mixing together and thoroughly incorporating. $3\frac{1}{2}$ drachms of potassium bichromate, and $1\frac{1}{2}$ drachms of sodium sulphate, and placing in a jar containing 1 pint of distilled water.

*Its Composition.**Advantages.*

Many advantages may be claimed for this reagent: it possesses great penetrating power, does not cause shrinkage of the cell, or fibrous tissues, and hardens uniformly. Sections are easy to manipulate, and are, as a rule, not brittle. Its sole disadvantage is that it slowly tinges the specimen a yellow colour, but this is invisible in microscopic sections and does not interfere with the staining. Its use is imperative if it is the student's intention to adopt for his sections Weigert's, Marchi's, Golgi's, or other special methods of staining. Müller's fluid may be sometimes usefully combined with methylated spirit, in the proportion of 3 of fluid to 1 of spirit. Specimens to be hardened must be cut into small pieces and placed in the fluid, which should be contained in large well-stoppered bottles or jars, after they have been washed for a few minutes in normal salt solution (common salt 75 parts, and water 100 parts). The washing rids them of blood and other extraneous matters. About 20 times the bulk of Müller's fluid must be employed for each specimen. It must be changed on the second and fourth days, and then at the end of every week, the bottle or jar, meanwhile, being kept in a cool place. After a fortnight or three weeks have elapsed, the tissue is transferred to a bottle containing methylated spirit or rectified spirits of wine, in order that the

And Methods of Using.

hardening process may be completed, and the colouring matter removed.*

Alcohol, in the form of methylated spirit or rectified spirits of wine, will be found of great service in dental microscopy for the hardening of structures and organs less delicate than embryos. It is particularly of use in many pathological cases. It does not stain the specimen, and hardens more rapidly than the bichromates. It causes a certain amount of shrinkage, and must not be used if blood corpuscles are to be retained in the capillaries of a part. The quantity of spirit should exceed the bulk of the specimen by about ten times, and need not be changed until it becomes a little cloudy.

*Uses of
Alcohol.*

The ordinary methylated spirit contains mineral naphtha, and becomes turbid when mixed with water, (Squire, "Methods and Formulæ," 1892, p. 3). This form must, of course, be avoided, for valuable specimens may easily be ruined by it. The best methylated spirit, free from naphtha, may be obtained from wholesale houses.

Other "hardening" reagents might be mentioned, but the above are all that are requisite for dental microscopy.

Histological Classification of Soft Tissues.

The soft dental tissues may be conveniently classified as—

(i.) Developmental, including those found in the early or late ante-eruptive periods; and

(ii.) Completed or post-eruptive.

For both these groups of tissues, methods similar to those already described, are to be followed,

* Some histologists prefer Erlicki's solution to Müller's fluid. Its constituents are the same as the latter, except that sulphate of copper is substituted for soda. It hardens a little more rapidly than Müller, but seems to possess no additional merit.

although modifications in imbedding and staining may be introduced, the general principles of fixing and hardening must be adhered to. Details as to cutting sections will be given later.

A.

To Obtain and Prepare Specimens of the Soft Developmental Tissues.

Remove several embryos and foetuses from the uterus of some animal, *viz.*, pig, cat, dog, rabbit, which has been killed with a dose of bi-cyanide of mercury administered by the mouth, or perhaps better, by bleeding from the common carotids and jugulars, after chloroform anæsthesia. Decapitate the embryos, and rapidly wash the head in plenty of warm normal salt solution to remove all traces of blood. This should be done while the animal remains warm. It will be noticed that the heads will show various stages of growth.

If practicable, with all the foetal heads, pass a sharp scalpel into the pterygo-mandibular articulation on each side, and cut right back. The lower jaw will then be removed *in toto*. Divide this in the middle line, and then with a razor subdivide it still further, vertically, into small portions.

Each of these pieces is then again to be washed in salt solution, and immersed in Müller's fluid, freshly made.

The upper jaws may be treated in the same manner, care being taken not to cut away the base of the skull.

After hardening is completed and the jaws decolorised by a fortnight's immersion in constantly changed alcohol, the pieces are allowed to soak for an hour in distilled water, they must then be transferred to a solution of gum mucilage prepared

according to the formula of the British Pharmacopæia. It is advisable to add to this medium a little pure carbolic acid—10 drops to 1 ounce of mucilage. Here the pieces of tissue may remain for a lengthy period without deterioration. (Plate III.)

For *very* early embryonic jaws, fixing and hardening with mercury and alcohol, and imbedding in celloidin are distinctly indicated.

The above remarks apply only to the earlier stages of developmental life, embryonic pigs, from one to six inches long being the most suitable animals to obtain. Jaws of animals *at birth* may be treated as above, with the addition of the following precautions:—The tissues covering the mandible, lips, cheeks, &c., must be carefully stripped off, leaving nothing save the oral epithelium and flange of gum. Great care must be exercised not to use undue pressure on the soft parts; it is important that the scissors and scalpel should be very sharp. Best results can be obtained from vertical sections of the canine and bicuspid regions, because here the cap of dentine and enamel which is being formed, is very thin and but semi-calcified, and the movement of the microtome cutter or razor does not disturb the normal relations of the parts.

The jaws of kittens, rabbits, or pups at birth are most useful for this purpose.

B.

The Second Group of Tissues—including gum, pulp, periosteum, &c., may be treated as above, or with alcohol. If the latter is used, the specimens must be placed successively into 30, 50 and 70 per cent. spirit in watch-glasses, with twenty-four hours' immersion for each. They can then be kept in rectified spirits (84 per cent.) until required for imbedding and cutting.

Other Methods.

Mr. G. G. *Campion* uses chiefly perchloride of mercury and spirit as a fixing and hardening reagent for the preparation of specimens of pulp.

Campion's Method.

In a communication to the author he describes his method as follows:—"Immediately after extraction, wrap the tooth in a duster or piece of rag, and crack it in the jaws of a strong vice so as to expose the pulp thoroughly, then drop it into a saturated aqueous solution of mercury bi-chloride. This *fixes* the tissue, killing the cells and other tissue elements, so that they are but little affected by other reagents to which they may afterwards be subjected. The time required for fixing, varies with the size of the pulp, and the completeness of its exposure to the fluid. The process is completed when the tissue has become thoroughly whitened: it may take from one to twelve hours. Use glass or wood instruments to manipulate specimens in the mercury solution, as iron or steel produces a precipitate which may injure the tissue. When fixed, it is necessary to remove the bi-chloride entirely from the tissue, and complete the hardening by successive strengths of alcohol. Both these processes can be carried on at the same time by dropping the tooth, after removal from the bi-chloride solution, first into a tube filled with 30 per cent. alcohol to which a couple of drops of iodine liniment (or four or five drops of tincture) has been added, and then into a tube, (Wolrab's bottle) containing 50 per cent. alcohol, in which three or four pea-sized lumps of iodide of potassium have been dissolved. Leave the specimen for twelve hours in each tube, and afterwards, for the same time, in successive tubes containing 70 per cent. to 90 per cent., and absolute alcohol.

"The iodine in the second tube throws down the mercury in the tissue as a red iodide, which is

readily dissolved by the potassium iodide and alcohol in the third tube. After remaining for twelve hours in absolute alcohol, the pulp must be carefully removed from the broken tooth with a scalpel, and placed in a tube or small dish containing cedar oil, on the surface of which a little absolute alcohol has been gently poured. These two fluids do not easily mix, and when the pulp has sunk to the bottom of the cedar oil it is ready for imbedding in paraffin, according to Mr. Mummery's method. The above is a modification of the method of hardening used in the Weil process."

Mr. Cyril Marson, in the "Journal of the British Dental Association," Vol. xiv., No. 7, recommends the following:—"A large bottleful of a solution of chromic acid in water of a strength of one-sixth per cent. must be made. For two or three specimens, two wineglassfuls of this, and one of methylated spirit must be mixed in a bottle or jar. The specimens are left in this for twenty-four hours, and the bottle occasionally shaken; the liquid is now poured off and a fresh supply given. In this they must remain thirty-six hours; two more supplies of solution must be given, in each of which the specimens must remain forty-eight hours. After this, they may be transferred to methylated spirit and kept until required. During this process, the specimens ought to be kept in a cupboard or dark room. Should they contain any calcified teeth or bone, hydrochloric acid in the proportion of about five or six drops to the ounce, must be added to the two last hardening solutions before placing in the methylated spirit."

*Marson's
Method.*

Dr. Rothmann,* of Buda Pesth, proceeds in the following manner, in the case of investigating diseases of the pulp and periosteum.

*Rothmann's
Method.*

* "Patho Histologie der Zahnpulpa und Wurzelhaut," Stuttgart, 1889.

(a) Tooth is washed in distilled water, and placed in absolute alcohol.

(b) Periosteum is detached from cementum by a sharp gouge or chisel.

(c) Tooth is split with a chisel or forceps and pulp carefully removed in its entirety.

(d) Pulp is then stained, imbedded in celloidin, hardened in alcohol, cut on a microtome and mounted in balsam.

Demonstration of Special Soft Tissues.

The Absorbent Organ can be obtained after the removal of a loose temporary molar, by snipping off with fine pointed scissors the soft tissue observed on the summit of the permanent tooth beneath. This is washed in salt solution for a moment, and placed in Müller's fluid for a week, then in alcohol for a fortnight. It should be imbedded in celloidin or paraffin.

The cells of the absorbent organ *in situ* are best demonstrated by treating a temporary tooth by Weil's method (Plate vi., Fig. 4).

The blood supply of developing teeth can be shewn by the methods of injection of capillaries (see future article); the jaws are then removed, hardened in Müller's fluid and alcohol, and imbedded in gum or celloidin (see Plate vii., Fig. 3).

To obtain specimens of the Dental Follicle and so-called "*Gubernaculum*." Purchase the lower jaw of a young heifer, which has just been killed, place it in a vice, and make vertical saw cuts between contiguous teeth in the incisor and canine regions. permanent teeth will be discovered enclosed in the follicle in the substance of the jaw. Cut slices from this soft tissue, wash, immerse in methylated spirit, and then transfer to rectified spirit for a month. Wash again and imbed in gum mucilage.

The Dental Gum can be sectionized after similar treatment to that just mentioned. It is better to prepare specimens *in situ* by the author's process.

Methods for Obtaining Sections of the Dental Pulp.

(i.) Crack a tooth longitudinally in a vice or with excising forceps, or fracture it with a hammer, and gently remove the soft organ with a pair of fine forceps or a needle-point. Treat it with Müller's fluid or alcohol.

(ii.) Sections can be quickly made by immersing a removed pulp in a 1 per cent. solution of osmic acid, which hardens the tissue and stains the nerve bundles. The organ should remain in the acid for twenty-four hours in the dark, or until such time that delicate dark lines—stained nerve fasciculi—are visible on its surface. Then wash with distilled water, and transfer to 70 per cent. alcohol till convenient to soak in gum solution.

The pulp nerves may be teased out by means of needle points, and then mounted at once, in normal salt solution. For a method of holding the needles see Fig. 5.

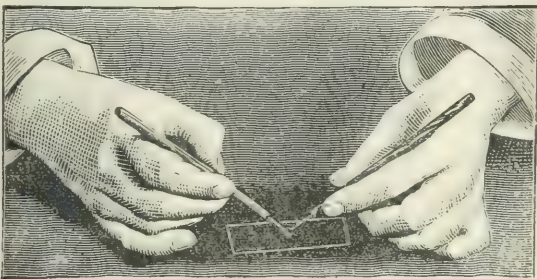


Fig. 5.

METHOD OF HOLDING THE NEEDLES
FOR TEASING OUT SPECIMENS.

If the structure of the medullated nerves is to be demonstrated, it is more convenient to use the incisor pulps of the ox.

(iii.) Pulp sections are always better when cut *in situ*, either by Weil's or the author's special process.

Isolated odontoblasts may be well studied by (i.) teasing them from the cap of dentine which is being produced in developmental specimens. A section having been cut on the microtome, is placed on a glass slide and its parts carefully separated by means of needle points. (ii.) Odontoblasts may also be obtained by splitting a tooth in a vice, removing the pulp, and scraping them, with the point of a sharp knife, from the surface of the pulp cavity, to which they closely adhere.

The mass so obtained should be laid on a slide, separated with needle-points, a drop of normal salt solution or glycerine jelly added, and a cover-glass applied and pressed down flat. They should be stained with solutions run under the cover-glass.

To demonstrate the long central processes of these cells, place an isolated dental pulp for 24 hours in a .6 per cent. solution of potassium anhydrochromate, and tease out in picro-carmin small fragments of its periphery.*

Much information of an interesting nature concerning the morphology of the *odontoblasts when observed in situ*, may be gained by studying pulps of varying ages—

(i.) They are seen in their most active state in vertical sections made through the canine region of the mandible of pulp at birth.

* Aitchison Robertson—Trans. Odonto-Chirurg. Soc., Nov., 1892.

(ii.) In transverse sections of adult human teeth whose roots are only partially developed.

(iii.) In transverse sections of adult canine teeth taken through the cervical region.

In the last mentioned instance, the marked difference in shape is noticed if the odontoblasts situated at the periphery of the long diameter of the pulp be compared with those in the short diameter.

Prepare specimens of (i.) by hardening in Müller's fluid and alcohol, and cutting on a microtome; of (ii.) by Weil's process; of (iii.) by the author's process.

Table of Soft Tissues suitable for Preliminary Treatment with

MULLER'S FLUID AND ALCOHOL.	ALCOHOL (84 per cent).	MERCURY PER- CHLORIDE, AND ALCOHOL.
1. Jaws of foetal animals.	1. Dental pulp, and peridental membrane.	1. Dental pulp, <i>in situ</i> , in young teeth, with incompleated roots.
2. Dental pulp, and certain of its pathological conditions.	2. Soft tissues in connection with large animals' jaws and teeth.	2. Isolated dental pulp.
3. Peridental membrane, and its pathological conditions.	3. Dental gum.	3. Peridental membrane.
4. In cases where special stainings are to be subsequently used.	4. Dental follicle when fully formed.	4. Cells of absorbent organ.
5. Absorbent organ isolated.		5. Very early embryonic jaws of animals.

(To be continued.)

HOW TO OVERCOME SOME OF THE DIFFICULTIES MET WITH IN CONTINUOUS GUM WORK.

By Mr. HARRY ROSE, L.D.S.Eng.

IN addition to the information previously published in my pamphlet "On Continuous Gum Work," the following hints may perhaps prove of some service to those who are desirous of attaining proficiency in this interesting specialty.

1st. How to allow for the slight lowering of the bite which occurs owing to a general shrinkage in the case after the first firing.

A very simple and effective way of obviating this difficulty is, after the platinum plate has been struck up, the teeth mounted and accurately fitted to the bite, and the case tried in the mouth, to cut out two or three narrow strips of tissue paper, damp them, and adjust to the alveolar ridge of model, then the plate with teeth attached can be replaced on the model and the plaster sections made as usual. The sections are made in the following manner:— Make three shallow grooves in the front, and two on each side of the plaster model. The three front grooves are to serve as guides to retain the front plaster section, which is to hold the six front teeth in position, and the others to do the same for the four molars and bicuspidis on each side. When the guides are made, place the case on the model, fasten it in position, so that it does not slip, now soap the surface of model and oil the wax and teeth, then mix up some plaster and apply it to the model, so as to cover the faces of the six front teeth, and corresponding portion of model. When hard, trim it up neatly and bevel it from the distal edges of canines forwards towards the front of mouth. The sides of this section are now soaped as well as the model, and the two side sections can be moulded at the same time. These three sections are so trimmed that they come up to, but do not cover, the crowns of teeth. The fourth or crown section is for this purpose. The crown section is made by pouring thick plaster upon the crowns of teeth after soaping the surfaces of the front sections, and as this must of necessity be very thin where it covers the front teeth, it should be strengthened by having a piece of curved iron wire let into the plaster while in its soft condition. It is absolutely necessary that the sections present no undercuts, and that they part from the model and teeth without dragging; they are now ready to be lined

with tissue paper. After the sections are trimmed up and removed, the plate and teeth are thoroughly cleaned, the tissue paper removed from model, and the plate allowed to fit up in its place again.

The teeth when inserted in the sections will be raised according to the layers of tissue paper used.

Three will usually be found sufficient to make up for the amount of shrinkage. In the event of a complete upper and lower set being made both models should be padded in the same way.

2nd. To strengthen and to roughen the plate, and to insert loops to hold the mineral compound firmly to the alveolar ridge.

Having, by trying in the mouth, ascertained the size of the plate required, take a length of soft platinum wire, draw it down to half pivoting size, then attach one end of it to the border of the plate with a clamp and solder with fine gold, the wire can then be bent and soldered a little at a time to conform to the plate, until the plate is quite encircled, this not only strengthens the plate and affords a support for the mineral compound, but enables one to give the edges of case a much better finish.

The roughening of the plate should be done with a triangular graver or the point of a sharp flat scalper over every part of the plate that the mineral is required to cover.

To form the loops to hold the body to the plate holes should be drilled, and, wherever required, short lengths of soft platinum wire soldered in with fine gold, the pieces of wire can then be bent at different angles. Eight or ten of these loops will usually be found sufficient for an upper or lower set. As a further means of attaching the mineral compound to the platinum plate, we must not omit to paint it over with a layer of gum enamel, which should be dried on, before packing in the compound.

All soldering should be done with fine gold, the copper in ordinary coin gold discolouring the enamel giving it a greenish tint.

3rd. To harden the mineral compound and render it easier of manipulation after moulding.

Some practitioners have found a difficulty in trimming up and putting an artistic finish on the moulded case, owing to the softness or rather friability of the mineral compound, this can be overcome by mixing it with a half tea-spoonful of gum tragacanth dissolved in water.

To dissolve the gum, take say three dwts. and place in a gallipot, then fill up with boiling water and place in an oven until it becomes like syrup. It should, when cold, be placed in a stoppered bottle ready for use.

4th. To replace a tooth or portion of the case that may be broken in trimming up.

It sometimes happens that a tooth gets disturbed or knocked out, while trimming up the case in its unbaked or soft condition; to replace it, thoroughly moisten the mineral compound, then wet the tooth, press into place, and finish with a damp spatula. To replace a portion of mineral that may flake off or break away, thoroughly moisten edges surrounding before adding fresh material to repair it.

5th. To cover the palate with gum enamel, after the platinum plate has been prepared and roughened, it should be slightly warmed, and then painted over with a thin film of gum enamel, this will quickly dry, after which one or two layers of mineral compound may be painted on with a large camel-hair pencil, reproducing the natural contours of the palate. It is necessary to have a thin layer of mineral compound in order to prevent the colour of the platinum from being seen through the gum enamel. The other parts of the case having being packed with mineral compound, it should be placed, teeth upwards, on silex, in the fireclay pot, and more silex poured over it until it be completely covered. After gradually heating up, it is ready for insertion in the furnace

THE FIRST FIRING.

According to my latest experience, it is safest to thoroughly vitrify the case at the first firing, so as to afford every opportunity for cracks or flaws to develop. If such should appear, let them be filled in with mineral compound, introducing into the crack or flaw, first of all a little water to encourage the compound to thoroughly flow in and fill it up completely. When dry the pink enamel can be painted on. On no account should a crack be filled up with enamel, as it will show a dark line when the case is finished.

TO PAINT ON THE GUM ENAMEL.

The enamel should be mixed quite thin, and painted on with a camel-hair pencil; if the moisture in the gum be absorbed too rapidly, the surface of the case should be moistened with distilled

water as the gum is laid on. When the first layer has dried, another can be added in like manner, until it is about the thickness of a threepenny piece. If the gum enamel is put on too thick, it is apt to flow unevenly and curl up.

THE SECOND FIRING.

On no account must anything come in contact with the enamel during the second firing. The plate may be supported on two or three clean pieces of fireclay, so as to make it rest evenly, but nothing must touch the enamel. While the case is warming up, in order to test the heat in the furnace, it is as well to insert two or three trial pieces; the time that these take to fuse will indicate whether the furnace is at the proper temperature, and the length of time the case will require for baking; one must not omit, however, the usual test piece on a tobacco pipe stem to go in the muffle at same time as the case.

The enamel should take about four minutes to fuse.

THE main subject for discussion at the coming summer meeting of the Copenhagen Dental Society, held August 13th and 14th, will be the question of school children's teeth. It will, by special invitation, be opened by Mr. George Cunningham. A conference will also be held on dental education and training.

THE distribution of prizes, at Guy's Hospital, took place on July 4th. The wards were open for inspection and the band of the Royal Engineers performed a selection of music. Tea being provided in the College Hall. The Dean presented a full report in which he referred to the continued activity of the Dental School, and to the successes of their students at the College of Surgeons. In the absence of Sir George Humphry, thorough illness, Dr. Clifford Allbutt, F.R.S., L.L.D., presented the prizes—the Dental being as follows:—*2nd year*, £15, Herbert Wallis, Hull; *Certificate*, Urban Edward Cave, Newbury. *1st year*, Joseph Lewin Payne, Kensington, and David Sydney Stevens, Stamford Hill, equal, £5 each; *Certificates* to Clarence Albert Harry Keall, Notting Hill, and to Arthur Wellesley Penrose, Highbury. *Practical Dentistry*, prize £10, Lionel Frederick Morris, Newport, Mon.; *Certificate*, Urban Edward Cave, Newbury. Dr. Clifford Allbutt then gave an address.

THE DENTAL RECORD, LONDON: AUG. 1, 1894.

WANTED!

NOT the least interesting item in the agenda list of the last meeting of the Medical Council was the motion to appoint visiting inspectors of dental examinations. We are, perhaps, inclined sometimes to over-estimate the merits of examinations, and to put too great faith in the value they profess to be able to give of the examinee's ability and knowledge. It is a fact that many boys, who may even stumble at a pass, and who would certainly fail utterly at an honour's examination, may yet, in later years, out-run their previously successful competitors. The successful men from a scientific, literary or money point of view, have by no means always been the scholars of their schools, or the heads of their classes. In the course of years, many who have opportunities of noting this fact, come to dislike and belittle examinations, with all the coincident cramming system, as much as in previous years they trusted, and have been overawed by them. Still, failing some more heaven-sent method for deciding a man's worth, it is our duty to endeavour to make the examinations, which guard the portals to our profession, as efficacious as may be. Such examinations should be of the pass variety, competition should find no place therein. Taking into account the existing state of knowledge, and the facilities there may be for its in-gathering, it should be possible to establish some standard examination, variable may be from time to time, but, for any given period, fixed for the whole of Great Britain and Ireland. Surely with the gradual bringing together of the parts of our land, by the increased means of locomotion, it is absurd that A shall be able to confer rights to practice

at B, after an examination, which B will not recognise. Either B penalises its inhabitants, or A unduly favours them. That examinations must be held at different centres is obvious, but, failing the possibility of having them conducted by the same examiners, we should, at least, endeavour to see they are much the same here as there, neither arbitrarily increased in severity here, nor unduly lowered there. It surely is a slur on Scotch and Irish Diplomas that they are not recognised as qualifying for posts in the great hospitals of London, with, we believe, but one exception, and this, being made after no investigation into men or matters, but under circumstances calling to mind the truism, "Necessity knows no choice," hardly affects the question. It is surely to the interest of all concerned, either that the ground for the slur should be removed, or that the slur should be proved groundless. Towards this end we hope the appointment of official visitors may tend.

FOUR SETS OF TEETH.

THE excellent paper of Mr. M. F. Woodward, which we gladly reprint on another page, will doubtless be read with interest by many. To others, who may not care to study the article *in toto*, we would specially commend the different summaries given of the views now held. The idea that a mammalian dentition bears traces of four sets of teeth is new to many, and may give rise to investigation as to whether traces of the two additional sets are ever met with in man. That a third set may sometimes be cut has, at times, been believed. Salter mentions various tales current of such instances, on which he throws doubt. It is certainly of note that these stories are of somewhat ancient date. One, however, Salter points out, Dr. Stare narrates "with earnest assurances of its truthfulness." It is of Dr. Stare's own grandfather, a Bedfordshire gentleman of an old

English family, who between his eighty-second and fifth year lost his front teeth, and these were subsequently replaced by a new set, which he retained till his death in his hundredth year. It seems difficult to disbelieve such a plain unvarnished story, and even if we class these teeth as supplemental, or, as some call them, supernumary teeth normal in form, we are still open to believe that, homologically speaking, they should be looked upon as the sporadic occurrence of teeth belonging to the fourth set.

News and Notes.

MR. FREDERICK CHARLES CONSTANT, L.D.S.Eng., has been appointed Dental House-Surgeon to Guy's Hospital.

THE Dental Hospital of London, and the Dental School at Guy's Hospital, have decided to raise their fees for students. In future they will be: total fee for hospital practice and lectures, £50 when paid in one sum, or 50 guineas when paid in two yearly instalments. Students requiring extra time will pay an extra fee of 7 guineas for every additional six months.

AT the Quarterly Meeting of the Council of the College of Surgeons of England, the Committee on Bye-laws presented a fifth report, in which they recommend to the Council that the fee to be paid for the Licence in Dental Surgery should be increased from 10 to 20 guineas, but that all persons duly registered as dental students on or before October 1st, 1894, shall be enabled to obtain the licence at the present fee of 10 guineas. The report was approved and adopted.

ACCORDING to J. F. Stephan, writing in the *Ohio Dental Journal*, the discoloration of teeth by amalgams, not copper amalgams, is generally due to sulphurets. The theory of bleaching them is to dissolve and wash out the substance that discolours them. The tooth is prepared and thoroughly dried as in all other methods of bleaching. We then proceed to thoroughly wash the cavity in order to dissolve the substances within the tubuli, first with an alkaline solution as

biborate of soda, or sodium fluosilicate, fluid, silicate, &c. ; secondly, with chloroform ; thirdly, sulphuric ether, then absolute alcohol, the alkaline solution and lastly with peroxid of hydrogen, repeating this process until the tooth assumes its natural colour. This operation requires some thirty to forty minutes. If this method has failed, decompose chloride of magnesia or chloride of tin with peroxid of hydrogen within the tooth.

AFTER much preliminary discussion, it has been decided to form a new Society, with its head-quarters at Newcastle. It will be called the "North of England Odontological Society." The first meeting was held in Newcastle-on-Tyne, on July 25th. Mr. J. A. Fothergill, President, was in the Chair. The meeting discussed and adopted the laws submitted by a Provisional Committee. Messrs. Warwick Hele and R. L. Markham were elected Vice-Presidents ; Mr. W. G. Routledge was elected as Hon. Treasurer, and Messrs. J. T. Jameson and W. D. Moon were elected Hon. Secretaries. The following gentlemen were then appointed as Council :—Messrs. W. Somerville-Woodiwis, R. A. Turnbull, C. F. Sutcliffe, A. E. Knowles, S. Brown, and W. J. Mason. It was decided to hold meetings in Newcastle, on the second Wednesday of each month, from October to March, inclusive.

THE Annual Meeting of Subscribers and Distribution of Prizes in connection with the Edinburgh Dental Hospital, Lauriston Lane, took place last month. There was a good attendance of directors, subscribers, and students, and Professor Sir Thomas Grainger Stewart presided. At the directors' meeting, held previously, Mr. G. M. Stuart (of Messrs. Stuart & Stuart, W.S.) was appointed secretary, in room of Mr. Lindsay Mackersy, W.S., who has resigned the post. Mr. D. Bailie Wilson was elected extra assistant in dental surgery ; and Mr. Robert Lindsay was elected tutorial dental surgeon. The Dean (Mr. Bowman Macleod) submitted the directors' report, which spoke of the continued success of the school. Since last session twenty-one students had completed their curriculum, and had gone up for the final examination for the L.D.S. of the Royal College of Surgeons, Edinburgh. There was now on the working roll thirty-eight students, and that number would be largely augmented when the next session was opened in the new

premises in Chambers Street. The work done during the session had been of a very progressive and satisfactory character. Year by year more attention was being given to the development of manipulative skill by a progressive course of technical instruction in the mechanical laboratory, a department which they hoped to see set upon a broad and liberal footing in the new laboratory, which would be much better furnished than their present one, thanks to the generous recognition of the Lord Provost and Town Council in their allocation of the Residue Grant. On the motion of Dr. Macdonald Brown, seconded by Councillor James Robertson, the report was approved of. The Chairman afterwards presented the principal awards, and in the course of some remarks, spoke of the excellent work which the institution had accomplished and was overtaking; and a vote of thanks was accorded him on the motion of Dr. John Smith, who offered him the congratulations of the directors and students on his receiving the honour of knighthood. The proceedings then terminated.

Two things are always interesting:—the old and the new. This time we would bring under notice some cases of ancient mechanical work which were detailed to the Rome Congress by V. Guerini of Naples. They follow more on the lines of what now-a-days is called bridgework, and, seeing that it dates back some two to three thousand years, is just a little bit awkward for those to explain who look on the above speciality as “something quite new and quite an American idea.”

THE first specimen was found in the Museum of Pope Ludwig in Rome, it consisted of four squarish rings of gold, through one of these ran a wire, soldered at either end, which had served to retain a molar, the tooth was, however, lost. The other bands surrounded teeth and retained the denture.

THE museums of Corneto, the ancient Tarquinia, capital of Etruria, yielded the rarest finds. A specimen was taken from a grave in the Necropolis, and said by the archiologist, Helbig, to belong to a

period preceding the Christian era by many hundreds of years. Bands of pure gold surrounded the right incisor and canine and the left canine bicuspid and the first molar. The missing teeth were the centrals and the second bicuspid—the latter tooth was missing but a transverse wire through the band pointed out its place. The centrals were still *in situ* and had been formed out of an unworn incisor of an ox. Bodies, being protected by the laws of religion, it would have been impossible to have obtained teeth. The bands round the teeth were about midway between the cutting edges and the neck and a space was left between the teeth and the gums.

Two other instances are figured, but they are made on the same lines as the above. In these cases natural teeth had been used, which, considering the above-mentioned laws to be in existence, must probably have belonged to the patients ; to have been, in other words, teeth which had become loose through absorption of the alveoli.

It is almost always the case that harelip, with a fissure through the alveolar process, is associated with cleft palate. In the *Cosmos*, Dr. Norman Kingsley puts a case on record in which cleft palate was not present, though the patient had both double harelip and cleft alveolar process.

THE DENTAL HOSPITAL OF LONDON.

THE Annual Distribution of Prizes took place at a *Conversazione* held at the Royal Institute Galleries, Prince's Hall, Piccadilly, on the 19th ult. There was a large attendance, the guests being received, as usual, by the Staff.

The DEAN (Mr. Morton Smale), after a few introductory remarks pointed out that the two chief prize-winners for the year, Mr. N. G. Bennett, and Mr. W. S. Nowell, were both University students.

Mr. CHRISTOPHER HEATH presided, after having presented the prizes, of which the following is a list :—*Saunders's Scholar*, Mr. N. G. Bennett. *Ash's Prize*, Mr. N. G. Bennett ; Certificate

of Honour, Mr. G. L. Bates. *Dental Mechanics*, 1st prize, Mr. W. S. Nowell; 2nd prize, Mr. E. H. A. Mackley; Certificate of Honour, Mr. N. G. Bennett. *Operative Dental Surgery*, 1st prize, Mr. H. W. Norman; 2nd prize, Mr. N. G. Bennett; Certificates of Honour, Mr. H. E. Mackley, Mr. J. H. Gartrell, and Mr. S. J. Hankey. *Metallurgy*, 1st prize, Mr. N. G. Bennett; 2nd prize, Mr. F. W. Jones; Certificates of Honour, Mr. G. E. Frost, and Mr. J. H. Gartrell. *Dental Anatomy*, 1st prize, Mr. N. G. Bennett; 2nd prize, Mr. W. S. Nowell; Certificates of Honour, Mr. A. E. Betteridge, and Mr. H. W. Norman. *Dental Surgery*, 1st prize, Mr. N. G. Bennett. *Students' Society Prize*, Mr. A. B. Densham. He said, that it was a great pleasure to him to be present, to take the Chair on that occasion, and to present the prizes, which he had already done, to the gentlemen who had so well earned them. And now it was his duty to say a few words. The task which had fallen upon him was a particularly pleasurable one, because from family connections and old associations he had a great deal to do with dental surgery. It was by a mere chance that he himself took up general surgery instead of dental surgery, and, as they would be aware, much of his work had been in connection with the dental profession. He believed that there was a book called "Heath on the Jaws," which many years ago won for itself the Jacksonian Prize. He was old enough to remember when the dental profession hardly had an existence as a profession; of course there were a good many able men in those days, but they were an exception. Much jealousy existed, and the best men had some reason of being ashamed of their brethren. Well, that was now all altered owing to the energy and perseverance of the leading members of the profession, among whom stood prominently Sir John Tomes, who he was glad to say was still among them, Mr. Samuel Cartwright, and Mr. Hepburn; thanks to these gentlemen, and others, the dental profession became a united body. The College of Surgeons was persuaded to get a new charter, which should be the charter of dental surgery. That charter was obtained in 1859, and as soon as it was procured it became an easy matter to found an examination, and, to their honour, everyone of those who took part in the movement submitted to the examination. This was the great charter of the dental profession. He was himself a young man at that time, and was willing to do anything to earn an

honest living. It so happened in the year 1862 that there was a large amount of discussion on dental matters, and he was asked to contribute articles on a subject of which he knew nothing, he was asked to contribute an article once a month to a journal in green covers, which still existed he believed but was then the only dental journal. He continued writing leading articles on dental matters, so far as he knew anything about them, for a considerable time. He might say that at that time the waters were not so smooth as they are now. There was a good deal of soreness between the two institutions, the one then in Soho Square and the one in Great Portland Street, and he was constantly told to put pepper in his article, which of course he did. In 1863 he was a young teacher in surgery, and it fell to his lot to prepare gentlemen for the licence. A good many passed through his hands, and many of them he was happy to say had since been most successful in life, and among them he could now count some of his best friends. They went on from the charter of 1859 to a very much more important matter, *viz.*,—the Dentists' Act of 1878, and that of course had made an immense difference to the dental profession. Previous to that Act there was nothing to prevent anyone calling himself a dental practitioner, and it was only by great efforts on the part of the leaders of the profession in those days that that Act became law. It had had effect both under the old form and also in the subsequent form of the improved Act of 1866; it had had the effect of bringing the dental profession, like the general surgical profession, under the guide and power of the General Medical Council. The Council, whatever its failing may be, do endeavour as far as possible to keep up the status of the medical and dental professionalism and he was sure they would be glad to know that the Act of 1878 was more stringent even than the Medical Act, thus it was easier to bring the dentist to book than the doctor. He noticed that in the last number of the "Journal of the British Dental Association" three successful prosecutions were recorded, and that seemed to him very satisfactory. Then those who found time to wade through the last reports of the Medical Council would see that notwithstanding all its labours connected with the medical profession they nevertheless took up questions connected with the dental profession, and more particularly that burning question of "advertising." He thought they might congratulate themselves that the profession had made so

much progress of late years, and he hoped that it would still go forward. Let him remind them that the profession had not failed to receive honours such as Her Majesty could offer, as illustrated in the persons of Sir John Tomes and Sir Edwin Saunders. He might also recall the fact that Sir John Tomes, as a member of twenty years' standing, had been elected a Fellow of the Royal College of Surgeons. So distinguished a name as Professor Huxley's was associated with Sir John Tomes when it was a question whom they should elect, and Sir John Tomes was elected; he was a man whom the Royal College of Surgeons was only too glad to recognise. He would now mention another matter, and that was the John Tomes' Prize. They would all be aware that a sum of money had been subscribed by the admirers of Sir John Tomes for the purpose of founding this Prize, and he would shortly mention that the Prize was a triennial one, open to licentiates in dental surgery, to be awarded for an original, or other scientific work, done partially or wholly in the triennial period. On the first occasion the prize was not to be awarded for any specific essay sent in, but would be adjudged to him who was thought most to deserve it. If at any time the prize should not be won for a dental subject the Council was empowered to award it for any subject other than dental connected with science. They would at once see the object of that, and its importance; it was to encourage in the dental profession collateral research, research in the collateral sciences. A man busy in his practice might be heartily weary of his work at the close of the day, but he might, and would have, interests in some other subject, and he might take up that subject, although not strictly connected with dentistry, and it would be recognised by the College of Surgeons. He heartily congratulated the dental profession on the fact of the institution of the Prize. The Jacksonian Prize, though equally valuable in money, was not in another sense so valuable, because it was awarded annually while the Tomes' would be only awarded triennially. Mr. Heath concluded by wishing the students a successful career.

Mr. DAVID HEBURN proposed a vote of thanks to Mr. Heath for presiding, which Mr. Heath briefly acknowledged.

The entertainments of the evening were then proceeded with, and were contributed to by the "Schartau" Part Singers, Madlle. Patrice (Illusioniste), and Miss Blanche Wyatt.

Abstracts and Selections.

ON THE SUCCESSION AND GENESIS OF MAMMALIAN TEETH.

By M. F. WOODWARD.

THE form and relations of the teeth have always occupied a prominent place among those characters which determine the systematic position and individual peculiarities of any mammal. And when we consider that owing to its composition a tooth is one of the most resistant structures which these animals possess, it will at once be evident that the importance of the teeth cannot be over-estimated in relation to the study of the past history of the group as determined from their fossil remains. We cannot, therefore, investigate too carefully the many doubtful points in tooth relationships, the solving of which may assist us in obtaining a more complete knowledge both of the inter-relationships of the different orders of mammalia and of the ancestry of the mammalian phylum itself.

The study of comparative odontology is a very old one, but it is not until we come to the beginning of the present century that we find any very comprehensive attempt to treat this subject in a systematic way. Such an attempt we owe to F. Cuvier (1), who was one of the first to give us any detailed description of the teeth of a large number of mammals and to endeavour to homologise the same.

Following closely upon Cuvier we find Owen (2, 3, 4, 5) in this country working at the same subject, and it is from his numerous memoirs that the science of comparative odontology may be said to have arisen. On comparing his results with those of more recent investigators, it is astonishing to find how very little our latest conclusions differ from those at which he arrived as early as 1868, especially when we consider the advances which have been made in the methods of observation.

His introduction (5) of a systematic method of expressing the dentition of a mammal by means of symbols has been of immense use to comparative anatomists, although the use of these dental

formulæ may be in some instances carried too far, considering that they may only represent the apparent or physiological, and not necessarily the true, relationships between their component teeth.

A very interesting paper published in 1868 by Lankester and Moseley (47) criticised these views of Owen's and suggested, with a good show of reason, a new system of nomenclature, which although of great interest has never been adopted.

Owen's subdivision of the mammalian dentition into two types, the *monophyodont* and *diphyodont*, implying respectively the presence of one set only or two sets of teeth, has endured until quite recently, although it was shown as long ago as 1869 by Flower (6) that this generalisation was incorrect.

His views as to the relation of the milk and replacing teeth vary considerably in his earlier and later works; thus we find him at one time stating that the marsupials possess milk incisors which are shed early in life, while in his latest work he says (4, p. 379) that the functional incisors, canines and deciduous molars of these animals are possibly to be referred to the first or milk dentition;* this, taken in conjunction with another statement which he makes (4, p. 368), *viz.*, that "the molars are a continuation backwards of the primary or milk series," shows that Owen in 1868 anticipated those views put forward as original in the last few years by various Continental observers, which have received such universal acknowledgment.

Next to Owen in this country we are indebted to Flower for a great advance in our knowledge of this subject; the latter was the first to study the fetal dentition in the flesh, and he by this means definitely determined the exact number of replacing teeth in the marsupials (7). From the study of the relations of the two dentitions in those animals and especially from the tooth change in *Thylacinus*, Flower put forward the theory that the persistent teeth in the marsupials corresponded with the second dentition of the placentalia, and that the milk teeth of the latter were a secondary set superadded

* The detailed description which Owen gave of the shedding of the supposed milk incisors (3, 5) leads one to think he must have had some evidence to go upon in making this statement. Recently I have described the presence of some additional vestigial incisors in *M. major* (12), and it seems just possible that Owen may have come across specimens in which these were abnormally developed and mistaken them not unnaturally for the deciduous incisors. His sudden change of opinion may have been due to the appearance of Flower's investigations (7) although he does not refer to them.

to the permanent ones and represented in marsupials by a single tooth only, the "third" (fourth) deciduous premolar. He further sought to demonstrate (6) that the homodont dentition of the cetacea was homologous with the second or replacing dentition of the more typical mammals. This last conclusion, which has been so long accepted, was deduced from a comparison between the dentitions of the Odontoceti and the Pinnipedia, the latter possessing a very much reduced milk dentition and functional teeth which have a tendency to become homodont.

Those views were accepted in their entirety by Huxley (8), and it was largely due to him that there was first formulated the conception of affinity between the cetacea and the seals (9). The comparison between the dentitions of these forms has been now shown to be misleading (26), as the cetacea possess persistent milk teeth, with which, in some cases, there are said to be fused vestigial replacing ones, while the pinnepedia on the other hand possess a well-developed replacing set, their milk set, even including the molars, being in some forms very much reduced.

Although the belief in the primary nature of the replacing teeth did not attain much support on the Continent it met with more success in England; and in 1887 Thomas (10) contributed a very important paper in which he supported this view. In this paper he identified the solitary changing premolar of the marsupials with the fourth premolar of the placentalia and not with the third as had hitherto been generally done, and he showed that it was pm_2 which was suppressed in all living marsupials. Four premolars were thus supposed to have been characteristic of the earliest mammals as well as of the later ones. This view was supported by the presence of a replacing tooth under the fourth cheek tooth of *Triacanthodon*, which Thomas demonstrated for the first time. This interpretation, although generally adopted, has been criticised by Cope (11), who believes that if Thomas's pm_2 exists it proves the presence of five, not four, premolars in the marsupials, as he considers with Owen (4) that the first so-called molar of these forms is really the last premolar. Continental observers (26, 32) persist in calling this changing tooth pm_3 , because they have been unable to find any trace of the missing pm_2 of Thomas in the developmental stage. While studying the development of the premolars in the *Macropididae* (12) I have deduced reason for the belief that the

successional premolar is in reality not a replacing tooth but a retarded milk tooth, intermediate in position between pm3 and pm4, and I further discovered the presence of one premolar germ in front of the functional cheek teeth. This would give us four premolars, without counting the first molar as do Cope and Owen.

The condition of this replacing tooth in *Macropus* might well appear to support the theory of Baume (13) that the two dentitions of the mamalia had a common origin in a single set lineally disposed, and that each alternate tooth, owing to the shortening of the jaw, became retarded in its development and displaced so as to be situated below and behind the tooth immediately in front, thus giving rise to the two apparently distinct generations of teeth, the underlying ones eventually pushing out the more superficial set.

This theory might explain to a certain extent the relation of the teeth seen in some reptiles (*i.e.*, *Tarantula*) and also the case of the premolars of *Macropus* just mentioned, but we have no palæontological evidence which in any way bears out this view in the mammalia and I should rather regard the case above recorded as a feature developed in the marsupials alone, *i.e.*, one in which a milk tooth has simulated the relations of a replacing tooth, and not as one which gives us any real clue to the relations of the milk and replacing dentitions.

All attempts to study the homologies of the individual teeth in different orders of mammalia are very important from a phylogenetic point of view, and we owe much to Thomas (10) for his careful study and suggestions in this direction. Unfortunately even now we know very little of the development of the teeth in the majority of mammals, and consequently we know next to nothing about the various vestigial teeth, which there is no doubt many of them possess. When Thomas wrote we knew still less, so that it is not surprising to find that many of his generalisations do not hold good. In the case of the incisors I have shown (12) that suppression does not necessarily take place at one end in the series but that it may commence in the middle. His very important discovery (14) of the presence of a milk dentition in *Orycteropus* carries on the work of Gervais, Flower (25), Tomes (24) and others, and shows that the Edentata are truly diphyodont, and that it is their milk dentition which has disappeared. Pouchet and Chabry (15, p. 173), who had previously worked at the *Orycteropus* by means of sections, had

described the presence near the symphysis of the lower jaw of a minute calcified tooth and an enamel organ of another tooth behind this ; these teeth which they regard as milk incisors, are anterior to those described by Thomas, and show that these animals originally possessed a complete and probably heterodont dentition.

Another instance in which the microscope has revealed an important discovery of teeth is that described by Poulton (16) of the true teeth of *Ornithorhynchus*, afterwards worked out by Thomas (17) and Stewart (18) in older specimens and shown to be functional. It would be of great interest to re-examine Poulton's sections in the light of recent discoveries, to determine if possible to which dentition these teeth should be referred.

Since Röse's discovery (19) of tooth germs in *Manis* there only remain the *Myrmecophagidæ* and *Echidna* as possible edentulous mammals, and there can be little doubt that even in these animals we shall ultimately find traces of teeth in the young.

On the continent we find that the milk dentition has long been regarded either as the primitive one, or at least equal in antiquity to the replacing set. The latter view was urged by Lataste (20), who considered that the two sets of teeth were inherited direct from the polyphyodont reptiles, and that the mammalia were primarily diphyodont.

The greatest contention has raged round the molars ; Lataste (20), maintaining that they belonged to the second dentition, was supported by Magitot (21), whereas Beauregard (22) believed them, as Owen had previously done, to belong to the milk dentition.

Nearly all these views were based on the study of dried skulls or of the relative position of the calcified teeth in the gum of the young animal and not on microscopic study of the relation of the enamel organs to one another, by which alone these points can be cleared up. It is true that Tomes (23) had done a great deal in the microscopy of teeth, and that Pouchet and Chabry (15), who had worked in this way at quite a number of mammals, had definitely shown amongst other things the relation of the minute milk incisors of the rabbit to the functional ones ; but the last-named investigators did not realise all that their specimens show, for they certainly figure the molar of a squirrel with what would be now regarded as a rudiment of a successional tooth.

Not until the last three years has the microscopic study of the developmental relationship of the sets of teeth occurring in mammals been seriously taken up. Now, however, we are almost flooded with literature on this subject, and in many instances we now are familiar with the development of the teeth from their earliest indication until the distinct sets are fully formed.

The earliest worker in this direction was Kükenthal (26, 27). His chief work (26, 28) deals with the hitherto supposed monophyodont dentition of the whales, which he has shown to be in reality diphyodont, the functional or most developed set being in the *Mystacoeti*, the remains of the milk dentition. In certain *odontocoeti* (*Phocoena*) he considers this to represent a fusion of the two dentitions, the milk set, however, predominating. He confirms the observations of earlier writers as to the primarily heterodont nature of the cetacean dentition and comes to the conclusion that the homodont dentition of these animals is secondary and largely due to a splitting apart of the component conical cusps of the double teeth. In like manner he has proved the diphyodont condition of the *Edentata*, and in *Dasypus* he has described three additional anterior vestigial teeth. But he is surely in error when (29, 403-4) he states that the similarity between the dentition of the cetacea, edentates and marsupials is due to the persistence of the first dentition, for the succession, as determined in *Tatusia* by Rapp, Kraus (46), Gervais (36), Flower (25), Tomes (24), and in *Orycteropus* by Thomas (14), shows that it is the milk or first dentition which is transitional, although in the first-named genus it may persist for some time as a series of functional and rooted teeth while the adult dentition is undoubtedly the replacing or second set. In the marsupials (27) he showed for the first time, by the discovery of an almost complete series of rudimentary germs of a second set of teeth, that the permanent dentition with the exception of the one replacing tooth is a persistent milk dentition. He has thus unconsciously revived, after a lapse of twenty years, Owen's conclusions on this question, definitely showing that the milk dentition is not of secondary origin, but at least of equal antiquity with the replacing one; and his ultimate conclusion is that the two sets of teeth are to be regarded as sister dentitions.

Röse (30, 31), who had been working at the development of the teeth in the human subject previous to the appearance of

Kükenthals views, took up this new departure with great energy, and has since published about twenty papers dealing with the detailed development of the teeth of mammals, reptiles and fishes. Among the marsupials (32), to which he has largely devoted himself, he has confirmed Kükenthals conclusions, but he considers that the last incisor, in addition to the replacing premolar, is to be referred to the second dentition, a view which I have endeavoured to show is incorrect, as the tooth has the same relations as the anterior incisors, which are undoubted milk teeth (12). His work on the development of the human teeth (30, 31, 32) forms a most complete memoir of that subject, as also does that on *Didelphys* (32).

In his description of the dentition of the wombat (33), Röse figures what he considers to be a rudimentary milk dentition succeeded by a permanent set of prismatic teeth. This, I think, is not the natural explanation of his own facts. He depicts five incisors on either side, above and below, but of the upper ones two are small and calcified and obviously from his figure represent the same tooth in two generations, this is i₃ or 4, so we see that one incisor has been lost from the upper jaw, probably i₃, the remaining three incisors represent those of the typical diprotodonts of which No. 1 probably is the persistent tooth; below we have five incisors, i₁, 2 and 4 being vestigial and calcified, while i₃ and 5 are well developed, the former persisting in the adult. There is not the slightest reason for supposing that these larger teeth are not true, milk teeth. This explanation brings the wombat into harmony with the other marsupials and especially the *macropididæ*.

The third important contributor is Leche (34) and his work covers a wider range among the mammalia. While agreeing with the last two authors in the main, he believes that the milk dentition is in every respect older than the replacing one. His researches in the marsupials include a most interesting and new discovery in *Myrmecobius* of a number of small calcified teeth representing an earlier dentition than the milk set. This I have verified myself in the genus named and probably also in *Phascologale*; in order to distinguish the series from the milk set I shall for the present speak of it as the *pre-milk* dentition. This discovery relegates the milk dentition to a second and the replacing teeth of the higher mammals to a third generation of teeth.

The animal of whose dentition Leche has published the most detailed account is the hedgehog, in which he has discovered a very curious condition, for it appears that quite a number of the milk teeth persist in the adult dentition, *viz.*:—

$$\begin{array}{r} di_3, dpm_2, m \ 1-3. \\ di_3, dc, dpm_3, m \ 1-3. \end{array}$$

This, if true, would rather strengthen the time-honoured view that the insectivora are very primitive mammals.

Both Leche (34) and Kükenthal (35) in the seal, and Röse (31) in man, have come to the conclusion that there are traces of a third set of teeth succeeding the replacing set, so that together with the pre-milk series we appear to have in mammals traces of four dentitions, *viz.*:—

1st, or pre-milk dentition—minute calcified teeth never functional, present in *Myrmecobius*.*

2nd, or milk dentition—generally functional, the permanent dentition of marsupials and cetacea, more or less temporary in the higher mammals.

3rd, or replacing dentition—functional in most mammals, rudimentary in marsupials and cetacea.

4th dentition (?)—rudimentary in *Phoca* (?), occasionally functional in man (?).

While Leche maintains the view that the molars belong to the milk dentition and regards them as simple teeth, both Kükenthal and Röse consider that they are formed by the fusion of a number of distinct conical reptilian teeth. This idea is not a new one, it having been suggested by Gervais (36), Gaudry (37), and Dybowski (38) and others, to explain the structure of the elephant's and ungulate's molars, but Kükenthal was undoubtedly the first to apply it to all mammals. Röse has taken up this view very strongly, and he attempts to prove it by embryological evidence, especially by what he has observed in the chameleon (39), where the back teeth are each composed of three cones, which, according to him, arise independently of one another, this is true to a certain extent; but these cusps develop under a common enamel organ and there is no indication of their ever having possessed independent organs as would have been the case if they were distinct teeth, there being

* This pre-milk dentition is probably analogous to that seen by Leche in *Iguana* (40) and by Röse in the *crocodile* (41).

merely a differentiation of the cylindrical enamel epithelium over each cusp, which Röse considers sufficient evidence in favour of his view. Kükenthal professes (35) to have seen in the walrus the fusion of two rudimentary molar germs into one, but unfortunately he does not figure this interesting find. He, however, puts forward this view of the molar tooth genesis as a theory drawn particularly from the consideration of reverse process seen to be taking place in the cetacea, and partially from palæontological evidence. He first (26) adduced *Triconodon* in proof of this view, regarding the molar tooth of that animal as a product of the fusion of three simple reptilian teeth; but in his later paper (29) he puts forward the view that the multituberculata are the forms which best demonstrate this point, and regards the three longitudinal rows of cusps seen in the multituberculate molar as indicative of the fusion of three distinct tooth generations, each consisting of a number of similar teeth. In the molar of the higher mammals he sees only two tooth generations represented, *viz.*, the milk and replacing set. This last condition is exemplified in the porpoise, in which he believes a fusion takes place between the two dentitions (28, p. 411, fig. 89), but the facts which he there describes appear rather indicative of the formation of a cusp by outgrowth from a simple conical tooth with far less effort than is required to see in them the fusion of two distinct dentitions. His belief that the "anlage" of the would-be successional molar becomes fused with that of the milk dentition will not hold for all mammals, for if the lingual continuation of the dental lamina (35, fig. 20, f. 2c, p. iv.) represents the anlage of the replacing teeth that structure can be seen in some mammals to remain quite distinct from the adult molar and in the end to gradually disintegrate, as the growth energy is abstracted from it by the larger and earlier developed tooth.

We find then that at present sufficient developmental evidence is not forthcoming to justify the conclusion that the mammalian molars are formed by the fusion of distinct teeth. With regard to the palæontological evidence, that is by no means so conclusive as Kükenthal seems to suggest, for the majority of observers in this branch of the study, and notably Osborn (43) and Schlosser (44), maintain that the tritubercular tooth is the primitive mammalian type and that it is to be derived from the simple reptilian cone, not by fusion with two other teeth but by the development of accessory

cusps upon outgrowths of the pulp of the simple tooth. The steps in this evolution they exemplify by such forms as *Dromotherium* and *Microconodon* of the trias of North America, which may therefore be as old as the multituberculate *Tritylodon*, the molar of which Osborn hopes soon to prove to be itself a specialised derivative of the tritubercular type.

On the other hand, Forsyth Major, who has for years paid special attention to this subject (42), is strongly of opinion that the primitive mammalian molar was polybunous in character; and if this can be proved to be the case the coalescence theory will naturally remain the simplest and most natural explanation of the origin of this type of tooth from the reptilian cone.

Reconsideration of the above-cited facts leads us to the belief (i.) that the living mammalia show traces of from three to four distinct generations of teeth, and consequently (ii.) that they are potentially polyphyodont, (iii.) that the first set is vestigial and not functional in any living mammal, (iv.) that the second, which is so important in the lower mammals, is more or less replaced by the third in the higher forms, and (5) that this third dentition remains dormant in the marsupials and cetacea.

The point requiring immediate and renewed investigation is clearly the relation and mode of origin of the molar teeth, but I do not think we shall be able to make much advance towards the further solution of the general problem by embryological so fully as by palæontological research. If we are to regard it as proved that the triconodont tooth of the reptiles is formed by the fusion of three distinct teeth, we may safely apply the coalescence theory to the mammalian molar, but it is not likely that the latter would retain any very distinct indications of its originally distinct elements, especially if, as seems probable, the mammalia inherited their triconodont tooth, ready formed from their reptilian ancestor, in which case the early stages in the development would probably by now have been suppressed and the whole genesis abbreviated.

In the Ritter lecture, delivered at Jena in 1892, by Kükenthal (29), some very interesting views were put forward as to the origin of the mammalia, with special reference to the dentition, which he would derive from some lowly form of theromorphous reptile and not from the more specialised Theriodontia. It is quite possible that the latter and the Mammalia had a common ancestor; and I

think it is not improbable that the teeth of that form instead of being simple cones might already show traces of heterodontism.

The process of evolution of the specialised heterodont dentition of the Mammalia, or of the Theriodontia, from the simple homodont and polyphyodont dentition of the lower Reptilia would, I think, necessarily cause a reduction in number of the successional sets of teeth, due to an enlargement of one set and a consequent abstraction of growth, energy and material from the underlying sets. This specialisation would not appear in the first generation of teeth, which must necessarily be of small size from its early developement and consequent adaption to the small jaw of the young animal, and which would moreover be required for temporary use, while the larger and more complicated dentition was developing. The increased size and specialisation of the second set of teeth might well abstract the growth energy from the succeeding third and fourth sets which will consequently become much retarded and eventually cease calcifying. We find such stages illustrated by *Parietasaurus*, where the first dentition has probably been shed, the second is functional and the third is becoming reduced, and in the theriodonts, where the second dentition is still more specialised, no traces of the development of a third set is known (50, 51). We may thus provisionally conclude that the earliest mammalia may have possessed only two calcified sets of teeth, one of these being very slightly developed and quite temporary; and this tending to be still more so as the descendants of these animals developed their larger and more important heterodont dentition earlier and earlier; the process of reduction would go on until this first (pre-milk) dentition became either quite suppressed, as it is in the majority of mammals, or so much reduced as to be only present in the fœtus and never cutting the gum as is the case in *Myrmecobius* and possibly *Phascologale*. One very important feature concerned in the suppression of this set of teeth in the early mammalia must have been the development of the mammary glands, which by providing the young animal with food would do away with the function of these teeth, which were so necessary to the young reptile, who must feed himself as soon as born.

The phase in which the polyphyodont dentition was reduced to a single functional set (the milk dentition of the higher mammalia) is probably represented by the earlier mesozoic mammals, in which we have no indication of any tooth change.

As the mammalia became more advanced in their organisation this heterodont second dentition took a stronger hold and developed earlier, then the third set, which had perforce lain dormant, began to reappear. If we are to regard the tooth succeeding the fourth (third) premolar of the marsupials as a replacing tooth, which I have shown reasons to doubt, it would appear to have been the first of the third set to attain functional importance; and in favour of this view we may note that this tooth is one which, owing to the late developement of the molars, is primarily the most posterior cheek tooth, and is of great importance to the young animal and early becomes much worn and so needs replacing more than the anterior teeth. Thus in the marsupials we find the last vestiges of the first set of teeth (pre-milk dentition), then we have a well-developed functional set, the second or milk dentition, under which in the embryo we find traces of a complete set of germs of the replacing or third dentition, the one replacing tooth being doubtfully referred to this set.

In the Insectivora we find the next stage in the development of the third set of teeth, for in the hedgehog replacing teeth are developed to the following—

i1, i2, C, pm3, pm4.

i2, pm4.

the rest of the dentition consisting of persistent milk teeth.

In the majority of mammals replacing teeth of the third set are developed to all the incisors, the canines and the three posterior premolars, only a few like *Hyrax* developing a successor to the first premolar which in other cases is a persistent milk tooth.

If we do not regard the molar teeth as representing a fusion of several dentitions as advanced by Röse and Kükenthal, to which dentition are they to be relegated? Leche, Beauregard and Owen have considered them as belonging to the milk or second dentition, while I have tried to show that they belong to the third or replacing set. Owing to their late development and position in the jaw these teeth are much specialised, and they rarely show the slightest trace of any additional dentitions; but such structures have been observed both preceding and succeeding these teeth. Thus we find traces of three out of the four dentitions present for one tooth, and the whole question then turns on the point as to which set has been suppressed; if it is the first then the molars belong to the third replacing set, as Lataste, Magitot and I have suggested; if, on the other hand, it is

the fourth dentition which is wanting, then Leche is right in supposing the molars to belong to the milk or second set.

The whole process of the first appearance of the molars is so involved owing to the loss of connection between the dental lamina and the gum in the region of their development that it seems very doubtful if we shall find any very distinct traces of additional preceding or succeeding teeth.

Bateson has recently described (45) a large and varied number of abnormalities affecting the teeth. Many of these are simple sports or teratological cases, of which it is very difficult to offer any reasonable explanation ; but, on the other hand, I see no reason to doubt, as he does, that the majority of those cases where additional teeth are present may be explained by the supposed increased development of some pre-existing tooth germ in the foetus, especially as we now know of so many cases where these vestigial germs do exist (9, 12, 15, 27, 32, 33, 34, 48), and as these can in most instances be identified with definite teeth in the generalised mammalian dentition, I maintain that we are perfectly justified in trying to determine by comparison the individual homologies of these additional teeth, and further that they are often of great importance, as shown by Thomas in *Phascologale* (10). Bateson's comparison between the three normal and four abnormal premolars of *Ateles* (49) and the three sides of an equilateral triangle and the four sides of a square appears to me a little fanciful and premature, as I think it almost certain that when we examine the development of the teeth in that form we shall find that the germs of four premolars are invariably laid down, and that a definite one (retained in this abnormal specimen) always degenerates.

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WHAT "KALIUM-NATRIUM" IS.

KALIUM and Natrium are Latin terms for the alkali metals, potassium and sodium. The noted properties are: its softness, causing it to be easily cut like wax, the rapidity with which its silvery white surface tarnishes when exposed to air, its great lightness (sp. gr. 0.865), causing it to float upon water. The most striking of all properties which this metal possesses is its remarkable affinity for oxygen. When a piece of the metal is thrown upon water it takes fire and burns with a fine violet flame, floating about as a melted globule upon the water's surface, and producing in the

act of combination enough heat to kindle the hydrogen as it escapes. The violet colour of the flame is due to the presence of a little potassium in the form of a vapour. The same result occurs if the metal be placed on ice. Caustic potassa, or potassium hydrate, is found in solution. It is a very deliquescent salt, possessing the property of turning red litmus paper blue when dipped in a solution of it.

The metal sodium possesses similar properties to that of potassium, excepting that its affinity for oxygen is less great. Its physical characteristics are also the same, except its specific gravity, which is slightly higher (0.97°), including its melting point (95°C.). It does not take fire when thrown into cold water, although it is at once fused by the heat evolved. By holding a lighted match over the globule as it swims upon the water, the evolved nitrogen may be ignited, when its flame acquires a bright yellow colour from the presence of sodium vapours. By placing the metal on a piece of filtering paper laid on the water, it may be forced to ignite the hydrogen spontaneously, because the paper retains it in a stationary position, thus preventing it from being rapidly cooled by gliding over the water's surface. The salt formed in solution is identical in properties with the "so-formed" potassium salt. The reaction may be explained as follows :

$\text{K and Na} + 2\text{H}_2\text{O} = \text{K OH and Na OH} + \text{H}^2 + \text{heat.}$ First reaction.
Potassium, sodium, water, caustic potassa and soda, hydrogen.

$\text{H}_2 + \text{O} = \text{H}_2\text{O.}$ Second reaction.
Hydrogen, oxygen (from atmosphere), water.

Owing to the too energetic action of metallic potassium in the presence of moisture, Dr. Schreier observes that its use alone would be more or less attended with danger. He would modify the action of potassium by alloying the metal sodium with it.—
Western Dental Journal.

EMPHYEMA OF THE ANTRUM.

By Dr. EUGENE TALBOT.

IN neurosis and degeneracy one antra may develop to such an extent that it will be twice the size of a normal cavity. In such cases it is not uncommon to find the nasal cavities forced to the opposite side, and the antra of that side only the size of the end

of the little finger, and situated almost entirely inside the malar process. In such a jaw we should expect to find (in the case of the large antrum) a very thin wall, as described by Gray, but a far different condition exists upon the opposite side where the antra is very small. Here the walls are thick, and a drill would have to pass from one-half to three-fourths of an inch through the alveolar process to reach it all. Another condition, occasionally observed, is in cases of neurosis, and degeneracy; the nasal cavities, situated either to the right or left of the face, crowd the antrum to one side, and bring the floor of the nose directly over the alveolar process; in this case a drill passed through the alveolus would penetrate the nose.

The author has observed two cases where dentists, in attempting to drill through the alveolar process into the antrum, with a view of draining it, actually drilled into the floor of the nose. In conversation with specialists on the nose and throat, I have been informed that they have seen similar cases. Again, in some cases, the antra are almost entirely obliterated. Frequently the antra are divided into compartments by bony septa occasionally dividing the cavity into two or more nearly complete cavities. In such abnormal conditions, it would be reasonable to suppose that the lowest point in the floor of the antrum would be difficult to find.

Difference of opinion exists as to the cause of empyema of this sinus. By some it is believed to be an extension of inflammation of the mucous membrane of the nose due to cold, by others and especially by dentists, to alveolar abscesses. With a view of obtaining some facts in regard to this matter, some years ago I made a special examination of skulls with the following results: Of 6,000 antra examined there were 1,274 abscessed molar teeth. Of this number 76, or about 6 per cent., extended into and apparently discharged into the antrum, Septa were found in 963 cases. In the treatment of 384 cases of pulpless teeth in connection with the superior molar in the past twenty-four years, only four cases of diseased antra were observed.

Dr. M. H. Fletcher of Cincinnati, Ohio, examined 1,000 antra, in which 252 upper molars had abscessed, making 25 per cent. Of the 252 cases, twelve perforated the antra. The doctor found in 224 cases of pulpless molars treated by him only one case of pus in the antrum.

We must conclude, therefore, that diseased antra are rarely due to abscessed teeth. On the other hand, owing to the unstable, abnormal development of the bony frame work of this cavity, which is always found in neurotics and degenerates, we would expect to find inflammation extending from nasal cavities into the antra (especially when the openings are large) as a result of cold. Neurotics and degenerates are much more liable to disease, particularly of the mucous membrane, than those who possess normal development. To drain this cavity, medical men, but more particularly dentists, have been in the habit of extracting teeth or the roots of teeth, and when no teeth are present, drilling through the alveolar process in a perpendicular manner to reach the antrum. As has been shown, the antrum cannot always be reached by this procedure. From the extended examinations made by Dr. M. H. Fletcher and myself, both came to the same conclusion without the other's knowledge, that the best place to open the antrum was at the base of the malar process midway between the root of the second bicuspid and first permanent molar.

The author has been quite successful with a tube made of hard rubber (in the treatment of diseases of the antrum). They can be kept in stock at reasonable prices, softened in hot water, and moulded to any position required. The flange can be trimmed to any shape and degree, and the tube cut at any length. The cheek holds it in position, it can be kept perfectly clean and be readily adjusted when the opening is made through the alveolar process and fastened to a tube if necessary.—*Pacific Coast Dentist*.

THE APPLICATION OF THE RUBBER DAM.

By Dr. HENRY BARNES.

I HAVE never been able to understand how anything is gained by using small pieces of rubber dam. It should be large enough to well cover the mouth, cheeks and chin, so that it be held and kept out of the way during operations. Many breaks about the necks of the teeth after the dam has been applied are due to punching the holes too near together; punch them far enough apart so that the rubber will not be stretched in the interdental spaces, and be sure to punch enough holes.

TO IMITATE GOLD FILLINGS.

By B. H. CATCHING, D.D.S., Atlanta, Ga.

GET, from a china decorator, some gold paste such as is used for decorating china. Apply it with a small pointed brush to the artificial tooth in shape and position the filling is desired. Place the tooth in the furnace and fire to red heat. If the tooth can be watched during the firing, the flowing or fixation of the gold can be readily told. Two or three coats can be used. A firing is necessary for each coat. Polish with dry plaster on the finger, or with rouge.

CLOSURE OF THE JAWS.

By PAUL SWAIN, F.R.C.S.

AFTER enumerating the recorded cases of successful operations for closure of the jaws and adding some cases of his own, Mr. Swain says :—There are here twenty recorded cases of operation for closure of the jaws, the result of injury or disease of the temporo-maxillary articulation. Of these, seven resulted from the after effects of scarlet fever, three from measles, and subsequent otorrhœa, three from rheumatism, two from affections of the teeth, and five from injury. The operations performed were excision of the condyle or portion of the neck in eleven cases, Esmarch's operation in five cases, division of ligaments in two cases, simple division of the ramus in one case, and removal of portions of the neck in one case. In nearly all the cases various attempts had been made to remedy the defects by the use of the gag under anæsthetics and by the subsequent insertion of boxwood plugs. This practice was attended with universal failure, to say nothing of great suffering to the patients, loss of teeth, &c. It is to be hoped, therefore, that for the future this futile method will be dismissed as worse than useless.

The division of ligaments by Mr. Spanton's method does not hold out much prospect of permanent success. It will be noticed that Mr. Heath tried it in one of his cases and failed. Nor is simple division of the ramus encouraging. There

remain, then, to discuss the other two methods—viz., excision of the condyle, with or without a portion of the neck, or Esmarch's operation for removal of a wedge-shaped portion of the bone. Eleven of the cases were operated on by the former method, so that it may be presumed that hitherto surgeons have given it the preference. As regards the operation itself there can be no doubt that of the two it is by far the most difficult. Anatomical considerations would alone make it so. In one case the external carotid was wounded, and in others a facial paralysis ensued, which, although of only a temporary character, yet sufficiently demonstrates the dangers to the facial nerve. In most of the cases several vessels required ligature, and the recovery was tedious and sometimes attended with considerable constitutional disturbance. The resulting scar, also, on the face, especially in females, must be disfiguring. If, however, the results were vastly superior, there might be a compensation for these drawbacks.

Taking the recorded results as a whole, I am inclined to think that they are not sufficiently good to warrant as in incurring the extra risks and difficulties of the operation. In five of the cases the mouth could only be opened—one one-inch, two three-quarters of an inch, one nine-sixteenths of an inch, and one half-an-inch. In no case is there any voluntary lateral movement reported, with the exception of Mr. Barker's case (17), so that the grinding power in mastication, which one might have supposed would have been restored by this operation, is not recovered. The danger of subsequent ossification is also demonstrated in case 16.

I will now compare this procedure with the modification of Esmarch's operation which I have described. From an anatomical point of view there can be no doubt that the operation is a far simpler one. The incision is so placed behind the angle of the jaw as to be hardly perceptible. The careful raising of the periosteum from the bone not only renders the future steps of the operation almost bloodless, but affords great support to the central portion of the jaw, especially when, as in my case, both sides are operated upon simultaneously. The only really important parts divided are the inferior dental artery and nerve. From the artery there is little or no hæmorrhage, and should it occur it is most easily controlled by plugging. The division of the nerve is absolutely of no importance, the only result being slight

anæsthesia of the skin over the chin. The division of the bone at the angle sets free the whole of the masticatory apparatus of the lower jaw, which can be at once opened to its full extent. The subperiosteal method preserves the attachment of the superficial portion of the masseter to the angle of the jaw, and also that of the internal pterygoid to its inner surface, thus keeping intact the two elevator muscles. If a sufficiently large wedge of bone is removed the danger of relapse is very remote. Taking, therefore, into consideration the simplicity of the operation as compared with excision of the condyle, and the superiority of the results, I think it may fairly be suggested that the modification of Esmarch's operation is the one which surgeons in the future should prefer.—*Lancet*.

CORRESPONDENCE.

[We do not hold ourselves responsible in any way for the opinions expressed by our correspondents.]

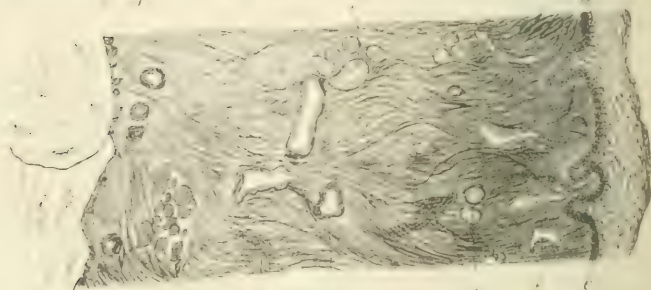
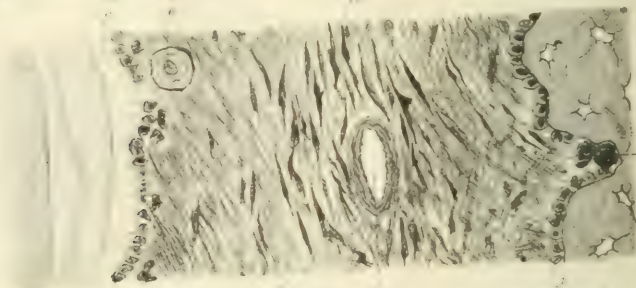
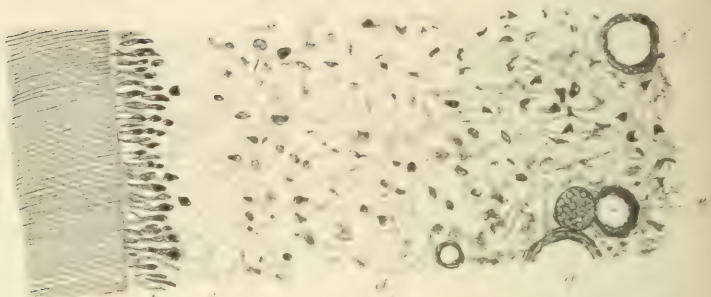
To the Editor of the "DENTAL RECORD."

PUBLIC CAUTION.

SIR,—There is a respectable looking couple making their way through the country at the present time. It is supposed they are proceeding from London to Liverpool, and travelling by road. The man professes to be in search of employment among dentists. They visited Leicester on Tuesday, July 17th, and obtained board and lodgings at our house, on the following Tuesday morning their bill was presented and they disappeared without paying it. Probably they are victimizing landladies in all towns they visit, they have little or no effects, our bill amounted to over £1. By inserting the usual caution in your paper you will stop their little game, they gave the name of Horsfield.

Yours, T. SLADEN,

17, Cank Street, Leicester.



Description of Plate IV.

Fig. 1.—Longitudinal section of crown of bicuspid to show the pulp *in situ*: decalcified (Author's process): stained gold chloride: 2 inch objective and A ocular: shows (a) dentine: (b) pulp *in situ*: (c) membrana eboris: (d) capillary: (e) nerve bundles.

Fig. 2.—Transverse section of pulp *in situ*: young canine tooth below cervical region: decalcified: stained rubine: $\frac{1}{6}$ inch and A ocular: shews (a) dentine: (b) odontoblasts (diagrammatic): (c) basal layer of Weil: (d) pulp tissue: (e) arteriole: (f) venule: (g) nerve bundle.

Fig. 3.—Longitudinal section of peridental membrane *in situ*: decalcified: stained hæmatoxyline: $\frac{1}{6}$ inch and A ocular: shews (a) cementum with lamellæ: (b) cementoblasts: (c) Sharpey's fibres: (d) lymphatics: (e) calcospherite spherule: (f) connective tissue fibres: (g) blood vessel cut obliquely: (h) "principal" fibres of membrane (i) bone of alveolus of jaw: (j) osteoblasts: (k) two osteoclasts.

Fig. 4.—Transverse section of gum *in situ*: decalcified: stained rubine: 2 inch and C ocular: shews (a) bone of aveolus: (b) its periosteum: (c) oral epithelium (stratified): (d) deeper layer of epithelium: (e) Rete Malpighi: (f) submucous tissue: (g) "glands" of Serres: (h) fasciculi of fibrous tissue: (i) mucous glands: (j) blood vessels: (k) muscle fibres.

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Original Communications.

DENTAL MICROSCOPY.*

BY

Mr. A. HOPEWELL SMITH, L.R.C.P.Lond.,
M.R.C.S.Eng., L.D.S.Eng.

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(Continued from page 351.)

ON THE PREPARATION OF THE HARD AND SOFT TISSUES COMBINED.

DENTAL histologists have of late years begun to recognise the importance of studying sections, where the soft parts are retained in their normal relationship to the harder tissues, with which they are so closely associated. Much time and labour have been spent in working out plans to attain this end; and, while considerable advancements have recently been made, one is still bound to admit, that, of all the processes known for this special purpose, not one satisfies the critic in every particular. This is easily understood when the remarkable density of bone, dentine, and cementum, and the extreme delicacy of structures, like the pulp or periosteum, are taken into account. Reagents applied for one purpose to a tissue, react often on other tissues, and imperfect results are obtained.

*Retention of
soft parts in
situ.*

*NOTE.—The drawings throughout this work are made for the most part, from original photographs.

There are, however, three chief methods of preparing specimens, the details of which, if carefully followed, lead to results which are approximately correct: and as such, one must be content to adopt these plans until some newer and more perfect suggestions are put forth. These are known as the chromic acid process, Weil's balsam process, and Hopewell Smith's process.

The Chromic Acid Process.

*For develop-
mental
tissues.*

This, the oldest process, is one in which chromic acid is used in the dual capacity of a hardening and softening reagent. It is very slow in its action; but it serves the purpose well when the student desires to make sections of embryonic jaws, of developmental growths in which hard tissue is present, and of fully grown teeth *in situ*. Its details are as follow:—

The jaw—preferably the lower—of an animal, such as a cat, dog, or monkey, is removed while still fresh, and washed in normal salt solution. It is then subdivided into vertical pieces, and immersed in a solution containing—

Chromic acid	45 grains.
Nitric acid	1½ drachms.
Water	1 pint.

*Simultaneous
Softening and
Hardening.*

The fluid should be kept in a stoppered jar or bottle, and renewed at the end of the second day, a large quantity being used for a small piece of tissue. The latter presents, after some time, a green appearance, due to the formation of chromic sesquioxide; but this colouring is invisible in microscopic sections.

When the tissue has become completely flexible and soft, removal and well washing for a lengthy period under a tap are indicated, and then immersion

for one to two hours in a neutralising solution of bicarbonate of soda, 1 drachm to 1 pint of water. The object is again washed, and finally transferred to gum mucilage, whence it is taken for microtome cutting.

In this way, if double staining be used, very beautiful and instructive slides may be made of those developing teeth in which the cap of dentine is thick, and also of temporary and permanent teeth, *in situ*, to demonstrate the method of eruption. (Plate 6, Fig. 1.) The enamel becomes, however, softened and removed *in toto*.

Dr. Weil, of Munich, has elaborated a plan in which the main feature is impregnation by balsam, after special preparation, followed later by grinding on a stone. The details were published * in England in 1888, and Mr. J. Howard Mummery introduced this process to the Odontological Society of Great Britain in 1890. The process attains very nearly to perfection; and if it is carried out in minute detail, highly satisfactory results are attained. Nevertheless it is open to several objections, amongst which, may be noticed, its tediousness and length of performance which requires constant attention, its inadaptibility to numerous important nuclear and specific stains, and its prolonged treatment with many and varied reagents at different degrees of temperature.

*Weil's
Method.*

Advantages.

Disadvantages.

Weil's Process.

(i.) Freshly extracted teeth are divided into several pieces with a sharp, fine fret-saw (watch spring saw), by being held between the fingers under cold water trickling from a tap, or squeezed from a clean sponge. This division enables reagents and stains to penetrate quickly and evenly into the pulp.

*Modus
Operandi.*

* "Journal Royal Microscopical Society, 1888," p. 1042.

Fixing.

(ii.) The pieces are then laid in a concentrated aqueous solution of corrosive sublimate for some hours, 6 or 8 being necessary as a rule. The mercury "fixes" the soft tissues, through coagulation of their albumens and gelatins.

(iii.) They are then placed in a dish, and water from a tap is allowed to wash them well for one hour.

(iv.) Removal to 30 per cent. alcohol is the next step. Here they remain for twelve hours. After transference to 50 per cent. and 70 per cent. alcohol for corresponding periods of time, they are put into a bottle containing 90 per cent. alcohol, to which has been added 1.5 or 2 per cent. of tincture of iodine. The iodine removes the precipitate in the tissue, by the production of iodide of mercury, which in its turn is eliminated from the specimen by a prolonged immersion in absolute alcohol. The teeth then appear quite white.

*Removal of Mercury.**Staining.*

(v.) Again the pieces of teeth are well washed under the tap, and stains are now used, Weil recommending borax-carmines. Grenacher's is the best for staining in bulk; but the alcoholic and not the aqueous must be used, as it penetrates well, and does not gelatinize, which the latter is apt to do after a time. Mr. Mummery has found that aniline blue-black stains efficiently in this process, and that it is particularly useful for ulterior photomicrographic purposes. Immersion in the colouring solution is prolonged. The time varies as to the thickness of the pieces, but from three to seven days will generally suffice.

(vi.) In order to fix the stain, it is necessary next to pass the pieces into acidulated alcohol, *viz.*, 100 c.m. of 70 per cent. alcohol, to which 1 c.m. of hydrochloric or acetic acid has been added. Here

they remain for twenty-four or thirty-six hours. If an aqueous stain has been used, half that time will be sufficient.

(vii.) The pieces are now transferred to 90 per cent. alcohol for fifteen minutes, and afterwards to absolute alcohol for half an hour. This prepares them for clearing.

(viii.) Oil of cloves or oil of cedar wood is to be used, and pieces remain here for twelve hours. *Clearing.*

(ix.) The oil is next quickly washed off with xylol, and the pieces suspended in pure chloroform.

(x.) Twenty-four hours later they are saturated in a chloroform extract of dried or desiccated Canada balsam, made about the consistency of treacle. They should be kept in this chloroform balsam for a day, and then more dried balsam is added to the solution until the chloroform can no longer take it up. Only a little is to be added at a time. This stage is reached in three or four days. *Balsam Impregnation.*

(xi.) The prepared pieces are finally placed in a china jar or other receptacle over a water bath kept at the temperature of 90° C. or 194° F. They remain here for two or three days or more, until the balsam in which they are imbedded, when quite cooled, cracks like glass on the introduction of a needle point into it.

(xii.) Thin sections are now made, by again cutting each piece into halves with a fret-saw under water, each piece being then ground down on a corundum or carborundum wheel on the lathe, and lastly rubbed on a Washita stone with the finger. *Grinding.* Chloroform balsam is to be used as the mountant.

Mr. Mummery recommends Wolrab's gold cylinder bottles, labelled, as being most convenient

for holding the various reagents through which specimens have to pass during the stages of the process. If a note of the stage they have reached be made on the labels of the different bottles, and the stages begun at different times, the process is not so complicated or troublesome as might at first be imagined. With reference to the process itself, special care should be taken in keeping the specimens sufficiently long over the water bath, because if this is not done, when the student begins to grind down the pieces, portions of the pulp, if not the whole organ, will be dragged away. On the other hand, prolonged heating leads to brittleness, the temperature should therefore never exceed 90° C. Rapid grinding should not be attempted; a slow cutting stone gives best results, and does not fill the tissue with detritus. The preparations seem to grind down more easily if they are left for some weeks exposed to the air previous to cutting on the wheel. The use of an indiarubber finger-stall has been found by Mr. Sydney Spokes to be extremely satisfactory in finishing the rubbing down of tolerably thin sections, during the final stages of Weil's process. The indiarubber seems to "surround" the specimen better, and hold it more firmly than do the finger-tips. It also prevents the latter from coming into contact with the stone.

Precautions.

Mr. Spokes' Method of Finishing.

In cases where trouble may be threatened by the different rate of wear when grinding hard and soft dental tissues, such as sections of jaw with temporary or permanent teeth *in situ*, the same worker adopts the following ingenious precaution:—

The Use of a Matrix.

One side of a somewhat thick specimen is ground smooth, and it is then sunk, finished side downwards, into a piece of softened A 1 composition, the other surface of the composition being pinched up to

make a kind of "handle." The surface of the section to be still further ground, is turned on to a glass slab, whilst the composition becomes cold. Both slab and section should be first well wetted, so that the composition does not adhere to them. One is thus enabled to make a matrix filling the irregular outline of the section, in which the latter may be conveniently ground until very thin.

Hopewell Smith's Process.

This method, like the preceding, has for its object the retention, *in situ*, of the hard and soft tissues. It was brought before the Odontological Society of Great Britain, in November, 1891, and a complete account of it can be found in that society's transactions. Its advantages are, briefly:— the retention of the soft parts in close juxtaposition to the hard tissues (*viz.*, pulp to dentine, peridental membrane to cementum or bone), the great ease and rapidity of its performance, its extreme simplicity, its adaptability to any method of imbedding in gum, celloidin, or paraffin, thus allowing, if desired, serial sections to be made. In addition, any number of sections can be cut in any direction from the same tooth, and by using a microtome these sections can be made thinner than by grinding down methods. There is a quick and permanent penetration of stains, which may be of any kind. Its great disadvantage is that the enamel is not preserved, as the acids rapidly soften and remove this tissue entirely. It is certain, too, that the hard tissues are chemically changed during the removal of their lime salts, but no appreciable alteration in structure can be noticed, this compensating in a great degree for the chemical differences that have occurred. M. Choquet,* of

Advantages.

Disadvantages.

* "Traité Technique des Préparations Microscopiques," 1894, p. 80.

the École Dentaire de Paris, speaks in praise of the acid solution and this process, but thinks that it has "a dissolving action on the nuclei of the cells (of the soft parts)." He suggests the addition of a 1 per cent. solution of chloride of palladium to obviate this "inconvenience."

*Preliminary.
Treatment.*

Details of the Process.—A newly-extracted tooth is well washed in normal salt solution for some minutes. In order to allow reagents to penetrate into the pulp, it is often necessary to enlarge the apical foramen or foramina with a fissure bur on the dental engine, and to make a counter opening through the crown. As a rule it is better to divide the tooth into halves, by cutting through the cervical region with a sharp fret-saw, allowing meanwhile a good supply of salt solution to moisten the dentine. In those cases where the pulp chamber is opened, by the progress of caries, these precautions need not be taken.

Hardening.

The pieces are now placed in a stoppered jar containing freshly-made Müller's fluid, the volume of the latter being about twenty to thirty times the bulk of the tooth. Fresh fluid should be used on the fourth day, and this changed again at the end of a fortnight. At the end of three weeks, pieces should be removed to alcohol (84 per cent.) for ten to twenty days or more. Rectified spirits of wine may be used in place of Müller's fluid from the first, and is preferable in some cases. Thus the delicate soft tissues are fixed and hardened. The portions of tooth are now taken from the hardening fluid and well washed. The soft parts and the apices of the roots must be dried on a cloth, and a large drop of flexile collodion or celloidin placed on them, in such a manner that in a few moments a thick film covers them over, and

*Protection of
Soft Parts.*

will protect them from the action of the acid reagents. The tooth is now placed in 12 c.c. of a 10 per cent. solution of hydrochloric acid, freshly made. A Wolrab's bottle is very useful for holding this decalcifying fluid. It should be labelled, and the hour of immersion and character of the specimen noted. At the end of fifteen hours, add 1.5 c.c. of strong, pure (non-fuming) nitric acid to the hydrochloric acid solution, and repeat this at the end of forty-eight hours. In about three or three-and-a-half days (seventy to eighty hours) the whole of the dentine and cementum should be completely decalcified. Temporary teeth and molars will require a shorter or longer acid immersion. The student must of course be guided by the amount of softening that has already taken place. This can be easily ascertained by trying to bend the specimen with the fingers or piercing it with a needle point *Decalcifying.*

If sufficiently decalcified, the tooth must be washed and placed in a solution of bicarbonate of soda or lithium (5 grains to the ounce) for half-an-hour, after which it is to be further subdivided by a sharp scalpel or razor, and the pieces well washed and put into gum mucilage solution. Here they remain for at least fifteen hours, care being taken that the pieces of tissue are not cut too large for complete saturation by gum. Removal of the film of collodion is best effected by allowing the tooth to remain in a watch glass of ether for about five minutes, and carefully picking or rubbing it off with a brush. This should be done before it is passed into the neutralising solution. The pieces of tissue are finally placed on the stage of an ether freezing microtome and cut in the ordinary manner. For the gum solution ether may be substituted *Saturating.*

Cutting Sections.

celloidin or paraffin—the former must be used if the tissues are exceedingly delicate and friable, and the latter, if serial sections are required.

Sections having been made, are next washed, stained, and mounted in the usual way.

Precautions. *Special Points.*—The hard parts must not be too much decalcified, the collodion film must cover up all the soft tissues, and the specimens must remain for a sufficient length of time in the gum solution. If the latter has been used as a saturating agent, it is advisable occasionally to dehydrate sections in the following manner:—

Special dehydration. They should be transferred from a watch glass containing 30 per cent. spirit, to 70 and 90 per cent., and absolute alcohol. The period of immersion in the varying strengths of alcohol should be one minute. This is to prevent the delicate pulp tissue from shrinking from the softened dentine walls, which sometimes occurs if the sections are at once placed in absolute alcohol.

Mr. Caush's Method.

Mr. D. E. Caush, in the “Journal of the British Dental Association,” suggests “A simple method of staining and cutting hard and soft sections combined.” He writes:—

“Take a freshly extracted tooth, and if it has a live pulp, place in alcohol for twenty-four hours to harden the pulp. On taking the tooth out of the alcohol, place it in a stain ‘made by dissolving any of the usual dyes in alcohol’, for two or three days. On removing the tooth from the dye, grind on the flat side of a corundum wheel, until the pulp is *almost* exposed; afterwards grind the opposite side until you have a section of the tooth, with a slight covering of hard tissue on either side of the pulp.

Now finish grinding down between two pieces of ground glass, with a small quantity of pumice powder moistened with alcohol or methylated spirit, until the section is as thin as required; towards the end of the grinding, use plenty of the liquid with little or no pumice powder. When ground down, wash thoroughly in distilled water; dry off the *surface moisture*, and mount in Canada balsam. With ordinary care, sections may be made with the hard and soft tissues in position. If we want to show the tubuli of the dentine, or blood-vessels, lacunæ, &c., of alveolus, place at once in the stain, and in the case of a tooth, the stain will pass up the pulp canal, and permeate the dentine by passing through the tubuli; after the tooth has remained in the stain for a day or two, prepare as above. Sections so prepared are especially adapted for examination with $\frac{1}{6}$ or $\frac{1}{8}$ inch objective."

The method seems to answer very well for making specimens of alveolar bone with the soft tissues retained *in situ*, but it is not conducive to best results to place the tooth in alcohol as directed, until an opening has first been made into the pulp chamber, so that the spirit can easily reach the soft tissues.

*For what
Available.*

*Summary of Weil's Process.**

Fresh teeth cut under water with watch spring saw.

Concentrated corrosive sublimate solution for some hours.

Running water, one hour or more.

30 per cent. spirit, twelve hours.

50 per cent. spirit, twelve hours.

* See, for this and the following summary, "Transactions Odontological Society," Vol. XXII., p. 222, and Vol. XXIV., p. 20.

70 per cent. spirit, twelve hours.

90 per cent. spirit and 2 per cent. iodine, twelve hours.

Absolute alcohol till teeth are white.

Running water, half-an-hour.

Stain, borax carmine, etc., three to seven days, according to stain used.

70 per cent. spirit (and 1 per cent HCl of borax carmine), twelve to thirty-six hours.

90 per cent spirit, fifteen minutes.

Absolute alcohol, half an hour.

Etherial oil, twelve hours.

Wash this off with xylol.

Chloroform, twenty-four hours.

Thin solution of dried Canada balsam in chloroform.

Thick solution of dried Canada balsam in chloroform.

Water bath at 90° C. till hard.

Summary of Author's Process.

Immerse a newly extracted tooth, after division with a fret-saw, under salt solution, in Müller's fluid for three to four weeks, and remove to spir. vini. rect. for ten to twenty days. Alcohol (84 per cent.) may be used instead of Müller's fluid.

Remove, wash in water, and seal up apical foramen and soft parts with collodion.

Place tooth in 15 c.c. of following solution:—

HCl, 12 parts (pure).

HNO₃, 30 parts (non-fuming).

Aq. dest., 108 parts.

Thus:—Take 12 c.c. of 10 per cent. solution of HCl, and at end of fifteen hours add 1.5 c.c. of HNO₃ and and at end of forty-eight hours add 1.5 c.c. of HNO₃ from commencement of immersion in acid solution.

Remove tooth at end of seventy-five to eighty hours and wash in a solution of lithium carb. (5 grains to an ounce) for half-an-hour. Wash thoroughly with distilled water.

Divide tooth by razor into several pieces and wash again in water. Place each in gum mucilage (B.P.). Leave in mucilage twelve to fifteen hours or more.

Transfer to stage of freezing microtome, cut, wash sections, and stain with orange-rubine, or gold chloride, or borax-carmin, or Weigert's solutions.

Dehydrate in absolute alcohol three minutes, "clear" in cedar oil one and a-half minutes, and mount in Canada balsam.

Table of Tissues suitable for Preparation by

CHROMIC ACID PROCESS.	WEIL'S PROCESS.	AUTHOR'S PROCESS.
1. Jaws of human and comparative embryos which contain large areas of hard tissues.	1. Pulp <i>in situ</i> .	1. Pulp <i>in situ</i> in both temporary and permanent teeth.
2. Jaws of animals with temporary and permanent teeth <i>in situ</i> .	2. Pulp in connection with semi-calcified dentine.	2. Peridental membrane <i>in situ</i> .
3. Fully developed human teeth.	3. Calcification of dentine.	3. Dental gum <i>in situ</i> .
	4. Teeth with incomplete roots.	4. Teeth of fish and animals where soft tissues are to be preserved.
	5. Adult teeth <i>in situ</i> .	5. In all pathological conditions, except affections of the enamel.
	6. Peridental membrane <i>in situ</i> .	
	7. Absorbent organ <i>in situ</i> .	
	8. Absorption occurring in adult teeth.	

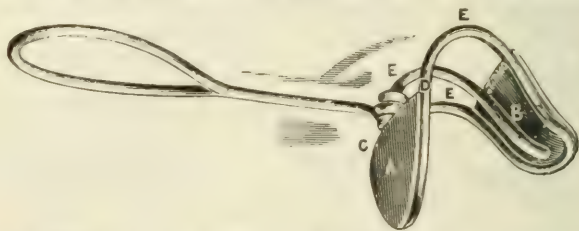
(To be continued.)

LOCAL ANÆSTHESIA.

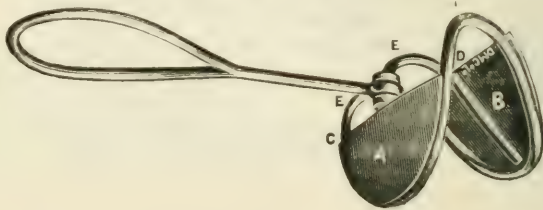
By A. JNO. CARDELL, L.D.S., Hon. Dent. Surg. Western Dispensary.

I MUST apologise for dragging this old and time worn subject once more before the notice of my confrères. But hearing that local anæsthetics are not being used at the present time to the same extent as they were formally for the extraction of teeth, I thought a few cases from my note book might be of interest to the readers of the "Dental Record." I venture to think the reason why they are not used so much is because of the non, or very partial, success attending them. This may not be due to the obtunder *per se*, but to the difficulty of its accurate and stable application to the part, until it shall have performed its office. (In this article I am not referring to sprays.) Owing to the foregoing experience, The Dental Manufacturing Company have kindly made for me the three trays seen in the representations, which I find meet every requirement, and they are now among the most useful of my dental impedimenta. They are simply and lightly constructed, being composed of thin plates and wire of sufficient strength for ordinary wear and tear.

No. 1, fitted with a bilateral movable handle, so that it may be used either side of the mouth for the upper and lower and bicuspid. When inserted in the mouth the plate A should always be on the labial side of the teeth to be removed, and B on the palatine. When required for the right upper teeth the handle should rest at point C, and at D for the left, and *vice versa* for the lowers.



No. 2, which is very similar to No. 1, having the same movements is adapted for the upper molars and bicuspid; also the centrals in the event of spongy gums or low palates.



It will be seen from the above cases that none escaped without a more or less trifling amount of pain, and I am convinced that for the absolute and certain painless extraction of teeth, we must ever fall back upon nitrous oxide gas or the other general anæsthetics.

The Dental Manufacturing Company have kindly consented to supply these trays, and I can only hope they will prove useful and alleviate much of the pain which has been borne hitherto.

In a recent case, a cousin of a dentist, on the south coast suffering from severe pulpitis, I applied for ten minims and extracted a very tough six year molar, without the slightest pain.

News and Notes.

MR. S. J. HUTCHINSON has been elected Consulting Dental Surgeon to the University College Hospital in succession to the late Mr. Ibbetson.

AT the Royal College of Surgeons, Edinburgh, during the July Examinations the following gentleman passed the first examination for the License in Dental Surgery:—John Alexander Young, Edinburgh; Alfred Lamymann, Middlesbro'-on-Tees; Seymour William Nicholas Swales, Sheerness; George Crichton, Perth; John Ainslie Duncan, Fife; Charles Herbert Fox, Gloucester; Boswall Cumming, Hull; Tom Tinley Tinley, Whitby; James Wallace Bell, Edinburgh; William Forsyth Tulloch, Elgin; and William Jones, Edinburgh.

The following gentlemen passed the Final Examination and were admitted L.D.S., Edinburgh:—Kenneth John Roy, Dundee; Robert Atkinson Hudspeth, Newcastle on-Tyne; Albert Leeming, Lancashire; Arthur Heron, Edinburgh; Alexander Cromar, Aberdeen; and Frederick Cornel Dopson, Liverpool.

THE Nineteenth Annual Meeting of the American Dental Society of Europe was held at Geneva, August 6th to 8th. The following officers were elected for the ensuing year. President, Dr. Chas. W. Jenkins, Zürich. Vice-President, Dr. Wm. Mitchell, London. Treasurer, Dr. Chas. J. Monk, Wiesbaden. Secretary, Dr. Wm. S. Davenport, Paris. Executive Committee, Dr. Jenkins, Dr. G. C. Daboll and Dr. A. C. Hugenschmidt, of Paris. Membership Committee, Dr. Mitchell, Dr. L. C. Bryan, of Basel, Dr. Waldo Royce, of Tunbridge Wells. The next meeting will be held at Boulogne, the first Monday in August, 1895.

AN excellent idea for keeping the cloth on the top of the bracket table clean, is to cover it by a piece of glass. It should be of about three-eighths of an inch in thickness and have its edges ground. It can be obtained at a small cost from any glass merchant.

WE have recently tried the idea, reprinted in our columns from another Journal, of using asbestos paper made up as holders for the workroom, and we are bound to confess with unsatisfactory results. The paper is almost bound to get wet and then spoils, we, therefore, had some made, in different sizes, of asbestos cloth and find these of great service. They are practically indestructible, can be boiled to cleanse and of course do not suffer the usual fate of workroom dusters—get burnt into holes.

THE resolution which the Nottingham Medico-Chirurgical Society recently passed, requesting a list of *non-advertising registered* dentists, and expressing an opinion that it is *unprofessional* conduct for a medical man to give anæsthetics to any dentist not coming under the above headings, has moved "the Accountant" to make some remarks. It fully approves the above resolution, and this from a lay paper is interesting, and it also expresses the wish that "the Incorporated Law Society could see its way to defining certain classes of legal work as unprofessional. Among these we should be disposed to include association with company 'wreckers,' with certain classes of promoters, with unqualified persons acting as trustees, liquidators and receivers, and generally with that class of persons misnamed 'accountants,' whose sole occupation appears to be to thrive upon the misfortunes and losses of others. We are, of course, mindful of the fact that these gentry are not always readily distinguishable, but no very material injustice would be wrought if it were declared unprofessional for solicitors to act upon behalf of persons styling themselves 'accountants' who were not carrying on a *bona fide* accountancy business. In the meantime solicitors are now supplied with a list of members of the Institute; and while we do not suggest that they should invariably decline to be associated with non-Chartered Accountants, we cannot refrain from directing their attention to the resolutions recently passed by a representative body of medical men, which are not altogether inapplicable to the relations existing between the legal and the accountancy professions."

[We are with the "Accountant" on all points.]

THE DENTAL RECORD, LONDON: SEPT. 1, 1894.

DENTAL STUDENTS AT GENERAL HOSPITALS.

WE fancy that most of us, looking back at our student days, are absolutely satisfied, neither with the way we availed ourselves of the opportunities that presented themselves, nor, altogether, with the chances we had. Perfection is in this, as in all else, hardly attainable, still it is our duty to strive towards it. The weakest point in the course of those students, who do not intend to take a medical as well as a dental qualification, is most certainly that which they take at the general hospital. We scarcely know to whom should be apportioned the larger share of blame for this condition of affairs, whether the student, who does not avail himself of his opportunities to the full, or his teachers, who seem content he should be allowed to slide through his curriculum in the present slip-slod fashion. This, to a large extent, is, we think, owing to a mistaken view of the status of a student. We would that the school authorities should look on students, not as men taking a course of study because they are interested therein, and who may be safely trusted to make the most of their chances, but as boys at a school, who are undergoing a compulsory curriculum, and which it is the duty of the teachers to see is fulfilled not only according to the written letter of the law but in a spirit of generous interpretation. It must be borne in mind that the student comes to the task hardly knowing the requirements, and certainly neither understanding how best to apply himself to master the subjects, nor seeing the importance of his preliminary work. Take, for instance, anatomy, here is a subject which cannot be learned by rote, but must be studied practically, and for this purpose the curriculum requires a course of twelve months in the dissecting room. It is perfectly obvious that the part of the body, which should specially occupy a dental student's time, is the head and neck, yet we are informed

by a teacher that he recently asked his class, some fifteen men, how many had dissected this part, and, save a couple, none of them had. The excuses were numerous; but if we admit the whole blame to be with the student it does not exonerate his teachers for having signed his schedule as having done that which he certainly has not. Take clinical instruction in surgery, which the student is supposed to receive, and again we find that few admit having received any, and they certainly give no evidence of knowledge so derived. It is not our object to go through the whole curriculum criticising each point, space does not permit, but in a student's number we may be allowed to plead that medical schools, who try to attract dental students, should also endeavour to teach them the subjects they go there to learn. It would be invidious on our part to recommend any one school to our readers, we are not in a position to do so of personal knowledge, and the only special mention of dental students, in the prospectuses of the schools, is that regarding the amount of fees they shall pay. One school does certainly offer an entrance scholarship, and at the same the introductory lecturer last October played to the gallery by remarks, concerning dental men and matters, in so much worse taste than wit, that the two Dental Surgeons resigned their posts as a protest. We do not remember to have noticed any equally public disassociation from these remarks by the other members of the school, nor can we offer any means of reconciling this method of attracting and repelling students at one and the same time; we are afraid we must leave the point with the many other unexplained wonders in Heaven and on earth.

THE following method for clarifying wax is given by C. W. Berry. To the old wax, in a basin, add a pint of water containing half-an-ounce of oxalic acid crystals. Boil slowly for half-an-hour and set aside to cool, giving it plenty of time. Scrape off the refuse beneath the cake and should it be of too light a colour add, when melted, some pigment.

STUDENTS' SUPPLEMENT.

REGISTRATION OF DENTAL STUDENTS.

THE registration of dental students shall be carried on at the Medical Council Office, 299, Oxford Street, W., or at the Branch Offices, 1, George Square, Edinburgh, and 35, Dawson Street, Dublin.

Every dental Student shall be registered in the manner herein-after prescribed by the General Medical Council.

No dental student shall be registered until he has passed a preliminary examination, as required by the General Medical Council,* and has produced evidence that he has commenced dental study.

The commencement of the course of professional study recognised by any of the qualifying bodies shall not be reckoned as dating earlier than fifteen days before the date of registration.

Students who commenced their professional education by apprenticeship to dentists entitled to be registered, or by attendance upon professional lectures, before July 22nd, 1878 (when dental education became compulsory), shall not be required to produce evidence of having passed a preliminary education.

Candidates for a diploma in dental surgery shall produce certificates of having been engaged during four years in professional studies, and of having received three years' instruction in mechanical dentistry from a registered practitioner.

One year's *bona fide* apprenticeship with a registered dental practitioner, after being registered as a dental student, may be counted as one of the four years of professional study.

The three years of instruction in mechanical dentistry, or any part of them, may be taken by the dental student either before or after his registration as a student; but no year of such mechanical instruction shall be counted as one of the four years of professional study unless taken after registration.

* Exception may be made in the case of a student from any Indian, Colonial, or foreign university or college, who shall have passed the matriculation or other equivalent examination of his university or college, provided such examination fairly represents a standard of general education equivalent to that required in this country.

Forms of registration may be obtained at the office of the General Medical Council. No fee is required for registration as a student.

RESOLUTIONS OF THE GENERAL MEDICAL COUNCIL IN REGARD TO
THE REGISTRATION OF MEDICAL AND DENTAL STUDENTS.

Preliminary Examination.

1. Subject to such exceptions as the Council may from time to time allow, every Dental student shall, at the commencement of his studentship, be registered in the manner and under the conditions prescribed by the *Standing Resolutions* of the Council.

2. No person shall be allowed to be registered as a dental student unless he shall have previously passed a preliminary Examination in the subjects of general education as hereinafter provided.

3. It shall be delegated to the educational committee to prepare and issue, from time to time, a list of examining bodies whose examinations fulfil the conditions of the medical council as regards general education.

4. Testimonials of proficiency granted by educational bodies, according to the subjoined list shall be accepted; the council reserving the right to add to or take from the list.

5. A degree in arts of any university of the United Kingdom, or of the Colonies, or of such other Universities as may be specially recognised from time to time by the medical council, shall be considered a sufficient testimonial of proficiency.

LIST OF EXAMINING BODIES WHOSE EXAMINATIONS IN GENERAL
EDUCATION ARE RECOGNISED BY THE MEDICAL COUNCIL AS
QUALIFYING FOR REGISTRATION AS MEDICAL OR DENTAL STUDENT.

* * The Examinations in Divisions I., II., III., at present entitle to Registration on production of satisfactory evidence that the applicant has passed them.

I.—UNIVERSITIES IN THE UNITED KINGDOM.

University of Oxford.—(1) Junior Local Examinations; Certificate to include Latin and Mathematics, and also one of these optional subjects (Greek, French, German). (2) Senior Local Examinations; Certificate to include Latin and Mathematics. (3) Responsions. (4) Moderations. (5) Examination for a Degree in Arts.

University of Cambridge.—(6) Junior Local Examinations; Certificate to include Latin and Mathematics, and also one of these optional subjects (Greek, French, German). (7) Senior Local Examinations; Certificate to include Latin and Mathematics. (8) Higher Local Examinations. (9) Previous Examinations. (10) Examination for a Degree in Arts.

University of Durham.—(11) Examination for Certificate of Proficiency. (12) Examination for students at the end of their first year. (13) Examination for a Degree in Arts.

University of London.—(14) Matriculation Examination. (15) Preliminary Scientific (M.B.) Examination. (16) Examination for a Degree in Arts or Science.

Victoria University.—(17) Preliminary Examination; Latin to be one of the subjects. (18) Entrance Examination in Arts, to include all the subjects required.

University of Edinburgh.—(19) Local Examinations (Junior Certificate); Certificate to include English Literature, Arithmetic, Algebra, Geometry, Latin, and also one of these optional subjects (Greek, French, German). (20) Local Examinations (Senior Certificate); Certificate to include English Literature, Arithmetic, Algebra, Geometry, Latin, and also one of these optional subjects (Greek, French, German). (21) Preliminary Examination for Graduation in Science or Medicine and Surgery. (22) Examination for a Degree in Arts.

University of Aberdeen.—(23) Local Examinations (Junior Certificate); Certificate to include all the subjects required. (24) Local Examinations (Senior Certificate); Certificate to include English Literature, Arithmetic, Algebra, Geometry, Latin, and also one of these optional subjects (Greek, French, German). (25) Preliminary Examination for Graduation in Medicine and Surgery. (26) Examination for a Degree in Arts.

University of Glasgow.—(27) Local Examinations (Junior Certificate); Certificate to include all the subjects required. (28) Local Examinations (Senior Certificate); Certificate to include English Literature, Arithmetic, Algebra, Geometry, Latin, and also one of these optional subjects (Greek, French, German). (29) Preliminary Examination for Graduation in Medicine and Surgery. (30) Examination for a Degree in Arts.

University of St. Andrews.—(31) Local Examinations (Senior Certificate); Certificate to include English Literature, Arithmetic,

Algebra, Geometry, Latin, and also one of these optional subjects (Greek, French, German). (32) Local Examinations (Junior Certificate), to include all the subjects required. (33) Preliminary Examination for Graduation in Medicine and Surgery. (34) Examination for a Degree in Arts.

University of Dublin.—(35) Public Entrance Examination. (36) General Examination at end of Senior Freshman year. (37) Examination for a Degree in Arts.

Royal University of Ireland.—(38) Matriculation Examination.

Oxford and Cambridge Schools' Examination Board.—(39) Certificate, to include the following subjects, an adequate knowledge of English Grammar and Orthography, as shown in the course of the Examination, to the satisfaction of the Examiners, being held as conforming to the requirements of the Medical Council in regard to those subjects. (a) Arithmetic, including Vulgar and Decimal Fractions; (b) Algebra, including Simple Equations; (c) Geometry, including the subjects of the first three books of Euclid; (d) Latin, including translation and Grammar; (e) also one of these optional subjects, Greek, or any Modern Language, or Logic.

II.—OTHER BODIES NAMED IN SCHEDULE (A) TO THE *Medical Act*.

* *Apothecaries' Society of London.*—(40) Examination in Arts.

† *Royal College of Physicians and Surgeons of Edinburgh.*—(41) Preliminary (combined) Examination in General Education.

† *Faculty of Physicians and Surgeons of Glasgow.*—(42) Preliminary Examination in General Education.

* *Royal College of Physicians and Surgeons of Ireland.*—(43) Preliminary Examination; Certificate to include Mathematics.

III.—EXAMINING BODIES, IN THE UNITED KINGDOM NOT INCLUDED IN SCHEDULE (A) TO THE *Medical Act* (1858).

College of Preceptors.—(44) Examination for a First Class Certificate, or Second Class Certificate of First or Second Division, Algebra, Geometry, Latin, and either a modern language, or Greek, or Logic, having been taken. (45) Preliminary Examination for Medical Students.

* "The Council has recommended that these Examinations be discontinued."

† These Examinations are conducted by the Educational Institute of Scotland. (No. 49.)

Intermediate Education Board of Ireland.—(46) Junior Grade Examination ; (47) Middle Grade Examination ; (48) Senior Grade Examination ; Certificate in each case to include all the subjects required.

Educational Institute of Scotland.—(49) Preliminary Medical Examination.

Scotch Education Department.—(50) Leaving Certificates in each Grade and in Honours.

IV.—INDIAN, COLONIAL, AND FOREIGN UNIVERSITIES AND COLLEGES.

University of Calcutta.—(51) Entrance Examination.

University of Madras.—(52) First Examination in Arts.

University of Bombay.—(53) Entrance Examination.

Ceylon Medical College.—(54) Preliminary Examination (Primary Class).

University of M'Gill College, Montreal.—(55) Matriculation Examination.

University of Bishop's College, Montreal.—(56) Matriculation Examination.

University of Toronto.—(57) Matriculation Examination.

University of Trinity College, Toronto.—(58) Matriculation Examination.

University of Queen's College, Kingston.—(59) Matriculation Examination.

University of Victoria College, Upper Canada.—(60) Certificate of Full Matriculation in Arts ; or Second Class Provincial Certificate from Education Department.

College of Physicians and Surgeons of Ontario.—(61) Preliminary Examination.

Western University of Ontario.—(62) Entrance Examination in Medicine.

University of Manitoba.—(63) Previous Examination.

University of Fredericton, New Brunswick.—(64) Matriculation Examination.

University of Mount Allison College, New Brunswick, Canada.—(65) Examination for a Degree in Arts.

University of King's College, Nova Scotia.—(66) Matriculation Examination. (67) Responsions.

University of Halifax, Nova Scotia.—(68) Matriculation Examination.

Dalhousie College and University, Halifax, Nova Scotia.—(69) Matriculation and Sessional Examinations.

Provincial Medical Board of Nova Scotia.—(70) Matriculation Examination.

University of Melbourne.—(71) Matriculation Examination.

University of Sydney.—(72) Entrance Examination for Medical Students.

University of Adelaide.—(73) Senior Public Examination. (74) Junior Public Examination.

University of Tasmania.—(75) Senior Public Examination.

University of the Cape of Good Hope.—(76) Matriculation Examination. (77) Examination for a Degree in Arts.

University of Otago.—(78) Preliminary Examination.

University of New Zealand.—(79) Preliminary Medical Examination.

Christ's College, Canterbury, New Zealand.—(80) Voluntary Examinations; Certificate to include all subjects required.

Codrington College, Barbadoes.—(81) English Certificate for Students of two years' standing, and Latin Certificate or "Testamur."

Germany and other Continental Countries.—(82) Gymnasial Abiturienten-Examen, and other corresponding Entrance Examinations to the Universities.

Egyptian Government.—(83) Secondary Education Certificate, Arabic being accepted as a classic Language in place of Latin.

* * (a) The Certificates from the Bodies in the foregoing Section (iv.) must contain evidence that the Examination passed included all the subjects required by the General Medical Council.

(b) In the case of Natives of India or other oriental countries, whose vernacular is other than English, an Examination in a classic oriental language may be accepted instead of an Examination in Latin.

(c) The list of Examinations at present received as fulfilling the conditions of the Council as regards Preliminary Education will be revised by the Education-Committee, on returns to be obtained by the Registrar by the end of the year 1893, so as to include only those the standard of Examination of which, in the specified subjects of Preliminary Examination, comes up to the standard considered desirable by the Council.

REGULATIONS OF THE VARIOUS EXAMINING BODIES FOR THE DIPLOMA IN DENTAL SURGERY (L.D.S.).

1—PRELIMINARY EXAMINATION	Royal College of Surgeons, England.	Royal College of Surgeons, Edinburgh.	Royal College of Surgeons, Ireland.	Faculty of Physicians and Surgeons, Glasgow.
2—AGE at which the Candidate may present himself	Compulsory on all who commenced their Professional Education after July, 22nd, 1878. Must be registered as a Dental Student at the office of the General Medical Council, 299, Oxford St., London, W. Twenty-one.	Compulsory on all who commence their Professional Education after August 1st, 1878. This differs slightly from that required by the English College. Must be duly registered. Twenty-one.	Compulsory on all, except those who have passed one equivalent examination. Must be duly registered.	Compulsory on all who commenced the Professional Education after August 1st, 1878. Must be duly registered.
3—DURATION OF PROFESSIONAL EDUCATION	Four years subsequent to registration.	Four years.	Any age, but diploma cannot be granted until he is twenty-one. Forty-five months. (Four Academic years)	Twenty-one.
4—COURSES OF LECTURES, &c., to be attended at a recognised School :— Anatomy	A Course of Lectures during not less than six months or one Winter Session...	** For students commencing after October, 1890. (3.) One Winter Course. (Six months.)	One Course.	Four years. One Winter Session.


	Royal College of Surgeons, England.	Royal College of Surgeons, Edinburgh.	Royal College of Surgeons, Ireland.	Faculty of Physicians and Surgeons, Glasgow.
Physiology	One Course. (Six months.)	Six months.	One Course.	One six months' Course.
Practical Physiology (separate from above)	Three months' Course.		One Course.	
Chemistry	Instruction in, which must include Practical Chemistry and Physics.	Ditto (held to embody Metallurgy).	One Winter Course.	Ditto.
Practical Chemistry	One Course.	Three months.	One Summer or Winter Course (including Metallurgy).	Three months (includes Metallurgy).
Materia Medica	Instructions in Chemistry, Practical Chemistry and Materia Medica need not be taken in the general hospital and may be taken before registration. ** Attendance at Class Examinations obligatory.	Three months.		Ditto.
Dissections and Practical Anatomy	Twelve months.	One Course of Twelve months (Practical Anatomy).	Two Winter Courses (including Dissections and Demonstrations).	Twelve months (Dissections).
Metallurgy	One Course.		Included in Chemistry Lectures.	One Course.
Course of Lectures on Surgery	Six months, or one Winter Session.	One Course.		One Course.
One Course of Lectures on Medicine	Six months, or one Winter Session.	One Course.		One Course.
Practice of Surgery, and Clinical Lectures	Two Winter Sessions.	Six months (at a recognised Hospital).	Two Sessions of nine months each.	Not less than six months.

	Royal College of Surgeons, England.	Royal College of Surgeons, Edinburgh.	Royal College of Surgeons, Ireland.	Faculty of Physicians and Surgeons, Glasgow.
Dental Anatomy and Physiology, Human and comparative	Two Courses.	One Course.	One Course.	Twenty-four Lectures.
Dental Surgery & Pathology	Two Courses.	One Course.	Two Courses.	Twenty Lectures.
Dental Mechanics	Two Courses. ** Attendance at Class Examinations obligatory.	One Course.	Two Courses.	Twelve Lectures or Demonstrations.
Practical Instruction in Mechanical Dentistry ...	Three years under the instruction of a competent Practitioner, or under the direction of the Superintendent of the Mechanical Department of a recognised Dental Hospital, where the arrangements for teaching Mechanical Dentistry are satisfactory to the Board of Examiners in Dental Surgery. In the cases of qualified Surgeons evidence of a period of not less than two instead of three years of such instruction will be sufficient.	Three years under a Registered Dental Practitioner, or in Mechanical Department of a recognised Dental Hospital whose arrangements are held to be satisfactory to the College (4).	Not less than three years under a Registered Dentist in acquiring a practical familiarity with the details of Mechanical Dentistry.	Three years under a Registered Practitioner. Attendance at Hospital (6).

This instruction may be taken prior to the Date of Registration as a Dental Student.

	Royal College of Surgeons, England.	Royal College of Surgeons, Edinburgh.	Royal College of Surgeons, Ireland.	Faculty of Physicians and Surgeons, Glasgow.
Practice of Dental Surgery in a recognised Dental Hospital, or in the Dental Department of a recog- nised General Hospital...	Two years.	Two years.	Two years (7).	Two years (7).
5—FEE	£21 over and above stamp stamp duty. For all Students registered on or before October 1st, 1894, £10 10s.	£4 4s. for First. £6 6s. for Second.	£10 10s. for First, and £10 10s. for Final. Fees for re-examination £5 5s. each part.	£4 4s. for First. £6 6s. for Final.
6—LEAST period during which unsuccessful Can- didates are referred to their studies	Six months, subject to the decision of the Board.	Three months. ** No candidate admitted to this Examination who has been rejected by any other Licensing Board within three months.	Three months.	Six months. ** No candidate admitted to this examination who has been rejected by any other Licensing Board within three months.
7—PARTICULARS OF EX- AMINATION	One Examination. (A) <i>First Day (Written).</i> On Anatomy and Phy- siology; and Surgery and Pathology. (Two ques- tions on each. Time two hours.) On Dental Anatomy and Physiology; and Dental Surgery and Pathology. (Three questions on each. Time three hours.) <i>NEW.</i>	<i>Written and Oral:</i> (3). 1st Part—Anatomy, Phy- siology, Chemistry with Metallurgy.	Two examinations. <i>Primary:</i> <i>First Day (Written).</i> 10 a.m. to 1 p.m. Five questions on Physics and five on Chemistry, including Metallurgy, three on each to be answered. 3 p.m. to 6 p.m. Five questions on Anatomy, and five on Physiology and His- tology, three questions on each to be answered.	<i>Written, Oral & Practical:</i> 1st part—Anatomy, Phy- siology, Chemistry, and Metallurgy.

Particulars of Examination.—continued	Royal College of Surgeons, England.	Royal College of Surgeons, Edinburgh.	Royal College of Surgeons, Ireland.	Faculty of Physicians and Surgeons, Glasgow.
(B) <i>Second Day (Practical).</i>		2nd Part—Surgery, Medicine, Therapeutics, and Special subjects of Dental Anatomy and Physiology, Dental Surgery, Pathology, and Dental Mechanics. Registered Medical Practitioners are examined on special subjects only.	<i>Primary:—continued.</i>	2nd Part—Surgery, Medicine, Materia Medica, and special Dental subjects.
(a) On the treatment of Dental Caries, and will be required to prepare and fill cavities with gold or plastic filling or other material, or to do any other operation in Dental Surgery.			<i>Second Day (Written and Oral).</i> 10 a.m. to 11.30 a.m. (Written). Five questions on Surgery. Three to be answered. 4 p.m. (Oral). 15 minutes in each of the following subjects—Chemistry, Anatomy, and Surgery.	Practical Examination at a Dental Hospital. Candidates are to bring Excavators, Files, and Plugging Instruments.
[Candidates must provide their own instruments.]				
(b) On the mechanical and Surgical treatment of the various irregularities of children's teeth.		There is a Practical Clinical as well as Written and Oral Examination in Dental and Oral Surgery. Pathology and Mechanics.	<i>Third Day (Practical).</i> Practical Examination in Chemistry and Histology at Royal College of Surgeons. Candidates are examined for at least half-an-hour in each subject.	
(c) In Mechanical Dentistry.				
(11) <i>Third Day (Oral).</i>			<i>First Day.</i> Practical examination in Clinical Dental Surgery and Practical Operative Dentistry, and Mechanics. Candidates are required to provide their own Instruments and gold for filling.	
Fifteen minutes each on Anatomy, Surgery, Dental Anatomy, and on Dental Surgery.				

Particulars of Examination.— <i>continued</i> ...	Royal College of Surgeons, England.	Royal College of Surgeons, Edinburgh.	Royal College of Surgeons, Ireland.	Faculty of Physicians and Surgeons, Glasgow.
8—DATE OF EXAMINATION.	May and November.	I. <i>Primary</i> Examinations. Tuesday, May 1, 1894. " July 24, 1894.	<i>Final—continued.</i> <i>Second Day (Written).</i> 10 a.m. to 1 p.m. Five questions in Dental Surgery and five in Dental Anatomy, three to be answered, 4 p.m. to 5.30 p.m. Five questions in Dental Mechanics (including Dental Metallurgy), three to be answered. <i>Third Day (Oral),</i> 4 p.m. Oral Examination, for 15 minutes, in Dental Anatomy and Physiology, Dental Surgery, and Dental Mechanics.	Wednesday, Oct. 3rd, 1894. — May 1895.
9—MODIFIED CONDITIONS OF ADMISSION TO EXAMINATION. (2).  (a) Conditions of eligibility.		II. <i>Final</i> Examinations. Following Thursday. N.B.—Students who commenced their professional education by apprenticeship, before July 22, 1878, are exempted from the Preliminary Examination	The Second Examination takes place on the two days following these dates.	

9—MODIFIED CONDITIONS OF ADMISSION TO EXAMINATIONS (<i>cont.</i>) (2).	Royal College of Surgeons, England.	Royal College of Surgeons, Edinburgh.	Royal College of Surgeons, Ireland.	Faculty of Physicians and Surgeons, Glasgow.
(b) Certificates, &c., required.			<p>Certificates of moral and professional character, stating he has been five years in practice, and has not attracted business as a dentist by advertising or other unbecoming practices, signed by two gentlemen holding Irish Medical or Dental Diplomas, members of the B.D.A. or Odontological societies.</p> <p>Name. Age. Address.</p> <p>Date of commencing practice, and whether such practice has been carried on in conjunction with any other business, and if so with what business.</p> <p>Professional status.</p> <p>Particulars of Professional Education.</p>	<p>(s)</p> <p>Various undertakings as to Professional conduct, &c., have to be made by the Candidate.</p>

9—MODIFIED CONDITIONS OF ADMISSION TO EXAMI- NATIONS (cont.) (2).		Royal College of Surgeons, England.	Royal College of Surgeons, Edinburgh.	Royal College of Surgeons, Ireland.	Faculty of Physicians and Surgeons, Glasgow.
(c) Manner of Examination					
Fee...	.. ..			£26 5s.	
For further information apply to Secretary.		F. G. HALLETT, Esq., Ex- amination Hall, Victoria Embankment, London, W.C.	FRANCIS CADELL, M.B., F.R.C.S.E., Secretary and Treasurer, 22, Ainslie Place, Edinburgh.	G. F. BLAKE, J.P., Royal College of Sur- geons, Dublin.	ALEX DUNCAN, Esq., Faculty of Physicians and Surgeons, Faculty Hall, 242, St. Vincent Street, Glasgow.

(1.) Candidates who are Members of the College, or who have passed the Examination in Surgery of the Examining Board in England, or who shall produce evidence of having passed the Examination in Surgery for the Licence in Surgery of the Royal College of Surgeons of Edinburgh, the Royal College of Surgeons in Ireland, or the Faculty of Physicians and Surgeons of Glasgow, or an examination in Surgery for a Degree in Medicine or Surgery at a University in the United Kingdom, will be exempt from re-examination in General Surgery and Pathology.

(2.) Candidates who have passed the Second Examination of the Examining Board in England, or who shall produce evidence of having passed the Examination in Anatomy and Physiology required for the Licence in Surgery of the Royal College of Surgeons of Edinburgh, the Royal College of Surgeons in Ireland, or the Faculty of Physicians and Surgeons of Glasgow, or an Examination in Anatomy and Physiology required for a Degree in Medicine or Surgery at a University in the United Kingdom, will be exempt from re-examination in those subjects.

(3.) For curriculum required for Students who have commenced their studies *prior* to 1st October, 1890, see Prospectus of Regulations, page 5.
(4.) One year's *bona fide* apprenticeship with a registered dental practitioner, after being registered as a dental student, may be counted as one of the four years of professional studies. The three years of instruction in mechanical dentistry, or any part of them, may be taken by the student either before or after his registration as a student; but no year of such mechanical instruction shall be counted as one of the four years of professional study unless taken after registration.

(5.) Candidates who have passed the First and Second Examinations of the Examining Board in England, or who shall produce evidence of having passed the First and Second Examinations of the Scottish Conjoint Board; the third Professional Examination of the Royal College of Surgeons in Ireland; the corresponding Examinations required for a Degree in Medicine or Surgery at a University in the United Kingdom, will be exempt from the First Dental Examination.

(6.) Attendance for two years at a recognised Dental Hospital, or the Dental Department of a recognised General Hospital, in which special provision is made for the proper training of Dental Students.

(7.) Practice of recognised General Surgical Hospital required for six months.

(8.) Candidates qualified in Medicine and Surgery are admitted to the Final Examination on producing evidence of attendance in the Special Dental Courses, including Two (instead of Three) Years' Practical Instruction in Mechanical Dentistry; and they are examined on the Special Dental Subjects only. Candidates who have passed the Examination in Anatomy, Physiology and Chemistry, before any recognised Medical Board are exempt from the First Examination.

SPECIAL (DENTAL) HOSPITALS.

LONDON SCHOOL OF DENTAL SURGERY, LEICESTER SQUARE.

DENTAL AND MEDICAL OFFICERS.

Consulting Physician.—Sir Richard Quain, Bart., F.R.S., M.D., F.R.C.P., L.L.D.

Consulting Surgeon.—Mr. Christopher Heath, F.R.C.S.

Consulting Dental Surgeons.—Sir John Tomes, F.R.S., F.R.C.S., L.D.S.; Mr. T. Arnold Rogers, M.R.C.S., L.D.S.

Dental Surgeons.—Mr. C. E. Truman, M.A. Cantab., M.R.C.S., L.D.S.; Mr. R. H. Woodhouse, M.R.C.S., L.D.S., L.S.A.; Mr. E. Lloyd Williams, M.R.C.S., L.R.C.P., L.D.S., L.S.A.; Mr. Storer Bennett, F.R.C.S., L.R.C.P., L.D.S.; Mr. W. Hern, M.R.C.S., L.D.S.; Mr. L. Matheson, L.D.S.

Assistant Dental Surgeons.—Mr. J. F. Colyer, M.R.C.S., L.R.C.P., L.D.S.; Mr. W. B. Paterson, F.R.C.S., L.D.S.; Mr. Percy J. Smith, M.R.C.S., L.R.C.P., L.D.S.; Mr. C. F. Rilot, M.R.C.S., L.D.S.; Mr. H. Baldwin, M.R.C.S., L.D.S.; Mr. H. Lloyd Williams, M.R.C.S., L.D.S.; Mr. A. Clayton Woodhouse, M.R.C.S., L.D.S.; Mr. W. H. Dolamore, M.R.C.S., L.R.C.P., L.D.S.; Mr. F. J. Bennett, M.R.C.S., L.D.S.; Mr. W. H. Woodruff, L.D.S.; Mr. C. Robbins, L.D.S.

Anæsthetists.—Frederic W. Hewitt, B.A., M.D. Cantab.; Mr. Carter Braine, F.R.C.S.; W. Dudley Buxton, M.D., B.S., Lond., M.R.C.P., Lond.; Mr. G. H. Bailey, M.R.C.S.

Assistant Anæsthetists.—E. A. Bridger, M.D.; Mr. George Rowell, F.R.C.S.; Mr. Henry Davis, M.R.C.S., L.S.A.; E. A. Bridger, M.D.; Mr. B. H. Comerford, M.R.C.S., L.R.C.P.

Demonstrators of Gold and other methods of filling.—Mr. T. H. Clarence, L.D.S.; Mr. A. B. Densham, M.R.C.S., L.R.C.P., L.D.S.; Mr. E. Gardner, L.D.S.; Mr. W. H. May, L.D.S.

Medical Tutor.—Mr. W. H. Dolamore, M.R.C.S., L.R.C.P., L.D.S.

Curator of Mechanical Laboratory.—Mr. A. J. Watts, L.D.S.I.
LECTURERS.—Dental Surgery and Pathology.—Mr. Storer Bennett.

Dental Anatomy and Pathology (Human and Comparative).—Mr. Arthur Underwood.

Dental Mechanics.—Mr. David Hepburn.

Metallurgy in its application to Dental purposes.—Dr. Foster Morley.

£25 ; a list can be had on application, but " The Kit " has been very carefully selected with a view to efficiency, and is well adapted for use in future practice.

Further particulars may be obtained on application to the Dean, who attends at the Hospital every Wednesday from 10 a.m. to 12 noon.

MORTON SMALE, *Dean*.

NATIONAL DENTAL HOSPITAL AND COLLEGE,

GREAT PORTLAND STREET, W.

HOSPITAL STAFF.

Consulting Physicians.—Sir B. W. Richardson, M.A., M.D., F.R.S. ; Sir W. H. Broadbent, Bart., M.D., F.R.C.P.

Consulting Surgeons.—Sir Spencer Wells, Bart., F.R.C.S. ; Christopher Heath, F.R.C.S.

Consulting Dental Surgeon.—Sir Edwin Saunders, F.R.C.S.

Dental Surgeons.—Messrs. F. Henry Weiss ; Alfred Smith ; Marcus Davis ; A. F. Canton ; H. G. Read ; C. W. Glassington.

Assistant Dental Surgeons.—Willoughby Weiss ; Sidney Spokes ; Edgar Beverley ; T. G. Read ; W. Rushton ; Sibley W. Read.

Anæsthetists.—Messrs. C. H. Cosens ; Dr. Reid Holmes ; C. J. Ogle ; G. Everett Norton ; Dr. Maughan ; Dr. Harold Low.

LECTURERS.

Demonstrator.—Dr. J. W. Pare.

Dental Anatomy and Physiology.—Mr. Sidney Spokes.

Dental Surgery and Pathology.—Mr. Willoughby Weiss.

Dental Mechanics.—Mr. Harry Rose.

Dental Metallurgy.—Mr. W. Lapraik.

Operative Dental Surgery.—Mr. George Cunningham.

Dental Materia Medica.—Mr. C. W. Glassington.

Elements of Histology.—Dr. James Maughan.

Demonstrator of Dental Mechanics.—Mr. W. R. Humby.

FEES.

GENERAL FEES FOR SPECIAL LECTURES REQUIRED BY THE CURRICULUM OF THE ROYAL COLLEGE OF SURGEONS OF ENGLAND.

The following scale of fees comes into force after October 1st, 1894:

Two Courses on Dental Anatomy and Physiology	}	£ 15 15 0
" " Dental Surgery and Pathology		
" " Dental Mechanics		
One Course on Dental Metallurgy		

FEES TO SINGLE COURSES.

				One Course.	Two Courses.		
Dental Anatomy and Physiology ...				£2 12 6	£4	4	0
Dental Surgery and Pathology ...				2 12 6	4	4	0
Dental Mechanics				2 12 6	4	4	0
Dental Metallurgy				3 3 0	5	5	0
*Operative Dental Surgery				2 12 6			
*Dental Materia Medica				2 2 0			
*Elements of Histology				1 1 0			
*Demonstration on Dental Mechanics				1 1 0			

Fee for the two years' Hospital Practice required by the Curriculum, £5 5s.

Total Fee for the Special Lectures and Hospital Practice required by the Curriculum, £31 10s.

The fees for the necessary General Hospital Practice and Lectures vary from about 55 to 65 Guineas, particulars of which are to be found in the Calendars of the several Schools.

SIDNEY SPOKES, *Dean*.

GUY'S HOSPITAL DENTAL SCHOOL.

Dental Surgeon.—F. Newland-Pedley, F.R.C.S., L.D.S.E.

Senior Assistant Dental Surgeon. W. A. Maggs, L.R.C.P., M.R.C.S., L.D.S.

Assistant Dental Surgeons.—J. Mansbridge, L.R.C.P., M.R.C.S., L.D.S.; H. L. Pillin, L.D.S.; G. O. Richards, M.R.C.S., L.D.S.; R. W. Rouw, L.R.C.P., M.R.C.S., L.D.S.; J. H. Badcock, L.R.C.P., M.R.C.S., L.D.S.; A. E. Baker, L.R.C.P., M.R.C.S., L.D.S.; J. O. Butcher, L.D.S.; F. M. Hopson, L.D.S.; H. Stoner, L.D.S.

Anæsthetists.—F. W. Cock, M.D., M.S.; J. F. W. Silk, M.D.; H. F. Lancaster, M.D.; W. J. Scott, M.B., B.S.; C. J. Ogle, M.R.C.S.

LECTURERS.

Dental Surgery and Pathology.—Mr. Newland-Pedley.

Dental Anatomy and Pathology.—Mr. Maggs.

Dental Mechanics.—Mr. Richards.

Metallurgy.—C. E. Groves, F.R.S.

Operative Dental Surgery.—Mr. Badcock.

Anæsthetics.—Mr. T. Bird.

*These Lectures are free to Students of the College who have fully entered for the Special Lectures.

DEMONSTRATORS.

Dental Microscopy.—Mr. Mansbridge.

Dental Mechanics.—Mr. Pillin.

Tutor.—Mr. Rouw.

Dean.—Dr. Shaw.

FEES.

A ticket which gives admission to the special lectures and demonstrations, and dental practice only, may be obtained for £50 paid on entrance.

The Course of Dental Instruction and Practice extends over a period of two years, and must be taken by the student continuously from the time of entering the School. Seven guineas is charged for any further period of Dental Practice not exceeding six months.

Arrangements cannot be made for short periods of instructions.

A ticket which gives admission to the *general* Lectures, Demonstrations, and Hospital Practice, required for the L.D.S., Eng., may be obtained for £60 paid on entrance, or 30 guineas at the beginning of the first year, and 30 guineas at the beginning of the second year. From these fees a reduction of 12 guineas will be made in the case of students who produce, on joining the school, recognized certificates of instruction in Chemistry, Practical Chemistry, and Materia Medica.

The inclusive fee for students entering for the course of instruction for the M.R.C.S., L.R.C.P., and L.D.S., Eng., is £190 paid in one sum, or 190 guineas paid by instalments at the commencement of each academical year:—first year 60 guineas, second year 60 guineas, third year 30 guineas, fourth year 20 guineas. Students who pay this inclusive Fee are allowed to pursue their Study of Dentistry during any period of their Medical Course most convenient to themselves, without further charge.

EDINBURGH.

DENTAL HOSPITAL AND SCHOOL.

Consulting Physician.—Alex. Peddie, M.D.

Consulting Surgeon.—Joseph Bell, M.D., F.R.C.S.E.

Fee for the two years' practice required by the Curriculum, £15 15s. Fee for each course of lectures, £3 5s.

Consulting Dental Surgeon.—John Smith, M.D., F.R.C.S.E.

Dean.—W. Bowman Macleod.

Dental Surgeons.—Messrs. W. Bowman Macleod; Andrew Wilson; Malcolm Macgregor; George W. Watson; J. Stewart Durward; James Macintosh; William Forrester.

Assistant Dental Surgeons.—John S. Amoores; J. Graham Munro; T. Gregory; John Turner; David Monroe; Frederick Page.

Extra Assistant Dental Surgeons.—Alex. Wilson, L.D.S.; Hume Purdie, L.D.S.; J. Malcolm, L.D.S.; D. Bailie Wilson, L.D.S.; S. Simmions, L.D.S.; R. N. Hannah, L.D.S.

Chloroformists.—J. M. Farquharson, M.B., C.M.; W. Lundie, M.D.; G. Matheson Cullen, M.D.; Basil Orr, M.D.

DENTAL SCHOOL (LECTURERS).

Dental Anatomy and Physiology (Human and Comparative).—Mr. Andrew Wilson.

Dental Surgery and Pathology.—Mr. George W. Watson.

Mechanical Dentistry.—M. W. Bowman Macleod.

Practical Mechanics.—Assistant Demonstrator, J. Stewart Durward. The demonstrations will be spread over the two years of hospital practice. Students will require to furnish their own hand tools.

SUPPLEMENTARY CLASSES (FREE).

Dental Materia.—William Guy, F.R.C.P. and S.Ed., L.D.S.Ed.

Gold filling.—H. B. Ezard, L.D.S.

Dental Metallurgy.—A. Forbes Watson, B.Sc.

Dental Histology.—G. W. Watson, L.D.S.

General fee for the Hospital Practice and Special Lectures required by the Curriculum.—Hospital Practice, £15 15s. One course each of Dental Anatomy, Dental Surgery, and Mechanical Dentistry and Demonstrations, £9 15s.—£25 10s.

Fees to separate Classes.—Dental Anatomy, Dental Surgery, Mechanical Dentistry, £3 5s. each.

The hospital practice and lectures qualify for the Dental Diploma of the Royal College of Surgeons, Edinburgh, and also for that of the other licensing bodies. Second courses of the lectures, as required by the Royal College of Surgeons of England, £2 4s.

The session, 1894-95, opens October 1st, 1894, General fee for the hospital practice and special lectures required, £25 10s.

For further particulars apply to the Dean, 31, Chamber's Street, Edinburgh.

GLASGOW DENTAL HOSPITAL.

4, CHATHAM PALCE, STIRLING ROAD.

Consulting Physician.—W. T. Gairdner, M.D., Professor of Practice of Physic, Glasgow University.

Consulting Surgeon.—Mm. M'Ewen, M.D., LL.D., Professor of Surgery, Glasgow University.

Dental Surgeons.—Biggs, John A., L.D.S.; Cameron, D. R., L.D.S.; Cameron, James, L.D.S.; Gray, W. H., L.D.S.; M'Cash, James M., L.D.S.; Martin, W. Foulds, L.D.S.; Naismith, Alexander, L.D.S.; Price, Rees, L.D.S.; Wallace, W., M.A., M.B., L.D.S.; Whyte, Alexander, L.D.S.; Woodburn, William Holt, L.D.S., D.D.S.; Young, A. B., L.D.S.

Assistant Dental Surgeon.—Simmers, J. Maxwell, L.D.S.

Administrator of Anæsthetics.—Henderson, T. Brown, M.D., F.F.P.S.

LECTURERS.

Dental Surgery and Pathology.—Rees Price, L.D.S.

Dental Anatomy and Physiology.—W. Wallace, M.A. M.B., L.D.S.

Dental Mechanics.—John A. Biggs, L.D.S.

House Surgeon.—J. M. M'Millan, L.R.C.S., & P. Ed., L.D.S.

Dean.—James Rankin Brownlie, L.D.S.

Secretary and Treasurer.—D. M. Alexander, 97, West Regent Street, Glasgow.

Fees for attendance on the Lectures and Hospital Practice, £23 2s., on entering.

BIRMINGHAM SCHOOL OF DENTISTRY, MASON COLLEGE (QUEEN'S FACULTY OF MEDICINE).

The teaching of Dentistry has been undertaken by the Queen's College acting in Association with the Birmingham Dental Hospital, and the Birmingham Clinical Board, so that students may fully qualify themselves for the Dental Diplomas of the Royal Colleges. The work of the Dental Faculty is carried on at Mason College, in premises especially erected for the purpose, and fitted up with a due regard to the requirements of a modern Dental Education.

LECTURERS FOR THE DENTAL CURRICULUM.

Dental Surgery.—Frank E. Huxley, M.R.C.S., L.D.S.

Dental Anatomy.—J. Humphreys, L.D.S.I., F.L.S.

Dental Mechanics.—F. Hampton Goffe, L.D.S.

Dental Metallurgy.—W. G. McMillan, F.C.S., F.I.C.

Surgical Diseases of the Mouth.—F. Marsh, F.R.C.S.

Medical Diseases of the Mouth.—Stacey Wilson, M.D., M.R.C.P.

DEMONSTRATORS :—*Operative Dental Surgery*.—W. T. Madin, L.D.S.

Mechanical Dentistry.—F. R. Howard, L.D.S.

Dental Pathology and Histology.—Dencer Whittles, L.D.S.

General Subjects.—As taught in Medical Department of Mason College.

COLLEGE FEES.

A Composition Fee of £42. payable in one sum or in two sums, viz., £21 at the beginning of the first year and £21 at the beginning of the second year of studentship, admits to the full curriculum required for the Dental Diploma (*exclusive of the necessary Hospital Practice*).

Students wishing to take the Diplomas of M.R.C.S., and L.R.C.P., in addition to their dental qualifications, pay a Composition Fee of £73 10s. This covers all College Fees.

HOSPITAL FEES.

The Dental Hospital Practice and Demonstrations

Composition Students (2 years)	£12 12 0
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Non-Composition Students (2 years)	£14 14 0
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Non-Composition Students (1 year)	£8 8 0
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Non-Composition Students (6 months)	£5 5 0
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For General Surgical Hospital Practice, Lectures, and Demonstrations.

Surgery (2 years)	£10 10 0
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Surgery (1 winter)	£6 6 0
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N.B.—Further particulars may be obtained on application to the Registrar at the College, or to the Hon. Secretary of the Dental Department, Mason College (Mr. J. Humphreys).

THE OWENS COLLEGE MANCHESTER.

DENTAL DEPARTMENT.

Professors and Lecturers.—Anatomy, Professor A. H. Young, M.B., F.R.C.S. Physiology, Professor Wm. Stirling, M.D. Medicine, Professor J. Dreschfeld, M.D., F.R.C.P. Surgery, Professor T. Jones, M. B., F.R.C.S. Clinical Surgery, Professor W. Whitehead,

Administrators of Anæsthetics.—D. J. Prince Stallard, M.B. A. Wilson, M.R.C.S.

Dean.—G. G. Campion, L.D.S.Eng.

The fee for two years' hospital practice required by the College of Surgeons, is £12 12s. For further information apply to G. G. Campion, *Dean*.

F.R.C.S.E. Practical Surgery, Messrs. G. A. Wright, M.B., F.R.C.S.; J. Collier, M.D., F.R.C.S. Operative Surgery, F. A. Southam, M.B., F.R.C.S. Chemistry, Professor H. B. Dixon, M.A., F.R.S. Organic Chemistry, Professor W. H. Perkin, F.R.S. Materia Medica, Professor D. J. Leech, M.D., F.R.C.P. Dental Surgery, George G. Champion, L.D.S. Dental Anatomy, W. A. Hooton, L.D.S., M.R.C.S. Dental Mechanics, Thos. Tanner, L.D.S. Dental Metallurgy, Dr. C. A. Burghardt. Operative Dentistry, G. O. Whittaker, L.D.S.

Demonstrator on Dental Histology and Pathology.—D. Headridge, L.D.S.

The fee for the two years' lectures, &c., required by the dental curriculum of the Colleges of Surgeons is £50, payable in two sums of £25 each at the beginning of the first and second years of studentship.

The two years' general hospital practice is taken at the Royal Infirmary. The fee is £10 10s., and includes that for attendance on the lectures on clinical surgery.

For further particulars with regard to the Dental Department, application should be made to the Registrar, The Owens College, Manchester.

THE VICTORIA DENTAL HOSPITAL, MANCHESTER,

16, DEVONSHIRE STREET, ALL SAINTS.

Consulting Physicians.—Dr. Simpson, M.R.C.S.; Dr. Leech F.R.C.P.

Consulting Surgeons.—E. Lund, F.R.C.S.; F. A. Heath, M.R.C.S.; T. Jones, F.R.C.S.; J. Hardie, F.R.C.S.

Consulting Dental Surgeons.—H. Champion, M.R.C.S.; G. W. Smith, M.R.C.S., L.D.S.Eng.

Dental Surgeons.—G. G. Champion, L.D.S.Eng.; E. P. Collett, L.D.S.Eng.; W. Dougan, L.D.S.I.; L. Dreschfeld, L.D.S.I.; J. W. Dunkerley, L.D.S.I.; W. Dykes, L.D.S., Glas.; W. Headridge, L.D.S.I.; W. A. Hooton, L.D.S.Eng.; I. Renshaw, L.D.S.I.; W. Simms, L.D.S.I.; W. Smithard, L.D.S.I.; T. Tanner, L.D.S.Eng.; G. O. Whittaker, L.D.S.Eng.

Assistant Dental Surgeons.—D. Headridge, L.D.S.Eng.; P. A. Linnell, L.D.S.Eng.; F. W. Minshall, L.D.S.I.; C. R. Morley, L.D.S.Eng.; C. H. Smale, L.D.S.Eng.

LIVERPOOL DENTAL HOSPITAL.

MOUNT PLEASANT.

Consulting Physician.—Thomas Robinson Glynn, M.D., M.R.C.P.Lond.

Consulting Surgeon.—Frank T. Paul, F.R.C.S.Eng.

Consulting Dental Surgeons.—C. Alder, L.D.S.; H. C. Quinby, L.D.S.; W. H. Waite, L.D.S., D.D.S.

Dental Surgeons.—M. Alexander, L.D.S.I.; Reg. H. Bates, L.D.S.Eng.; R. M. Capon, L.D.S.Glasg.; E. A. Councell, L.D.S.Eng.; L. Coysh, L.D.S.Eng.; R. Edwards, M.R.C.S., L.D.S.Eng.; W. Mapplebeck, L.D.S.I.; Thos. Mansell, L.D.S.Edin.; W. J. Pidgeon, L.D.S.Eng.; J. Royston, L.D.S.Eng.; Fredk. Rose, L.D.S.Eng.; E. A. Mansell, L.D.S.Eng.

Demonstrator on Operative Dental Surgery.—J. P. Roberts, L.D.S.Edin.

Chloroformist.—J. E. Gemmel, M.B., C.M.

House Surgeon.—L. J. Osborn, L.D.S.Eng.

The Liverpool Dental Hospital, founded in the year 1864, combines the work of a most useful charity with all the advantages of a Dental School recognised by all the licensing bodies.

The Hospital is conveniently situated within five minutes' walk of the Medical School. The premises are substantial, having four separate operating rooms and a work-room, all facing north, which is recognised as the best aspect for securing a good light.

There is an abundant daily supply of patients; over 20,000 cases were treated last year.

Every facility is afforded to Students who are anxious to acquire proficiency in Dental Surgery, and to prepare themselves for the L.D.S. of any of the licensing bodies.

The Committee have this year incurred considerable expense in re-decorating and painting the internal portions of the building, and a new room has been fitted up for the exclusive use of the students.

The electric light has been introduced (the lamps being supported on brackets specially manufactured), and will doubtless prove of immense advantage to the operators.

Fee for two years' hospital practice, 12 guineas. Perpetual 15 guineas. R. Edwards, *Dean*.

DEVON AND EXETER DENTAL HOSPITAL.

Consulting Surgeons.—Messrs. A. J. Cumming, F.R.C.S.Eng.; James Bankart, M.B.Lond., F.R.C.S.Eng.

Consulting Dental Surgeon.—S. Bevan Fox, L.D.S.Eng.

Dental Surgeons.—Messrs. J. T. Browne-Mason, L.D.S.Eng. ; Henry Biging Mason, L.D.S.Eng. ; T. G. T. Garland, L.D.S.I. ; J. M. Ackland, M.R.C.S., L.D.S.Eng. ; S. Mundell, L.D.S.Eng. ; J. A. Mallet, L.D.S.Eng.

Honorary Secretary.—Henry Yeo.

Attendance on the practice of this Hospital is recognised by the Royal College of Surgeons of England as qualifying for their Dental Diploma.

Pupils of any member of the staff or other registered Practitioner (being a Life or Annual Governor) are permitted to attend the practice of the Hospital, subject to the approval of the Medical sub-committee, on payment of £5 5s. annually to the funds of the Institution. Students attending the practice of the Hospital must consider themselves strictly under the control of the Medical Officers, and must not undertake any operation without the consent of the Dental Surgeon for the day.

THE DENTAL HOSPITAL OF IRELAND.

25, LINCOLN PLACE, DUBLIN.

Consulting Physicians.—F. R. Cruise, M.D. ; John W. Moore, M.D.

Consulting Surgeons.—E. H. Bennett, F.R.C.S.I. ; Sir W. Stokes, F.R.C.S.I.

Consulting Dental Surgeons.—R. H. Moore, F.R.C.S.I. ; Daniel Corbett, M.R.C.S.E., L.D.S.Eng.

Dental Surgeons.—Messrs. Robert Hazleton, F.R.C.S.I. ; W. Booth Pearsall, F.R.C.S.I. ; R. Theodore Stack, M.D., F.R.C.S.I., D.M.D.Harv., L.D.S. ; A. W. W. Baker, M.D., F.R.C.S.I., L.D.S. ; Daniel Corbett, jun., A.B., F.R.S.S.I. ; George Wycliffe Yeates, M.B., Ch.M., L.D.S.I. ; G. M. P. Murray, F.R.S.S.I.

Assistant Dental Surgeons.—J. S. Thomson, L.D.S.Edin ; Shenstone Bishop, L.D.S.I.

Anæsthetists.—Messrs. John G. Cronyn, L.R.C.S.I., K.L.D.C.P.I. ; John R. Graves, L.R.C.S.I., L.K.C., C.P.I. ; John B. Coleman, M.B., Ch.M., Ru.I.

Pathologist.—William Mallett Purser, M.D.

Registrar.—William A. Shea.

In connection with the Dental Hospital of Ireland, the Dental School will be open for the Winter Session on October 1st, 1894.

All Dental Students who have passed their Preliminary Examination are admissible to the Clinical Instruction of the Hospital, after paying Fees and subscribing to the conditions prescribed by the Staff.

In addition to Clinical Instruction, Courses of Lectures and Demonstrations will be given at the Hospital in Dental Surgery and Pathology, Mechanical Dentistry, the Administration of Anæsthetics, crowns, pivots, porcelain inlays, gold filling, regulating plates, &c.

The Lectures on Dental Surgery and Mechanical Dentistry will be given during the winter, those in Dental Anatomy and Metallurgy during the summer months.

In addition to the longer courses of Hospital attendance, special courses of three months duration, will be given to Surgeons about to join the Army and Navy, or to practice in the Colonies or remote country districts.

Regulations as to Fees and other conditions can be obtained from the Registrar of the Hospital, or from

R. THEODORE STACK, *Dean*.

MEDICAL SCHOOLS.

BARTHOLOMEW'S HOSPITAL, SMITHFIELD, E.C.

Fee for general subjects for students of dental surgery :—First winter, 31½ guineas ; first summer, 31½ guineas ; or a single payment of 63 guineas.

Dr. T. W. Shore, *Warden*.

CHARING CROSS HOSPITAL, W.C.

The Composition fee for dental students is 54 guineas in one sum, or 60 guineas, payable in two instalments of 30 guineas each, *viz* :—30 guineas on entering ; 30 guineas 12 months later.

Stanley Boyd, *Dean*.

KING'S COLLEGE, STRAND, W.C.

No special arrangements are made for dental students.

Prof. Curnow, *Dean*.

LONDON HOSPITAL, MILE END, E.

Composite fee for dental students :—Hospital practice and lectures, £42.

Munro Scott, *Warden*.

MIDDLESEX HOSPITAL, BERNERS STREET, W.

Students who intend to become Licentiates in Dental Surgery of the Royal College of Surgeons are admitted to attend the requisite courses of lectures and hospital practice on payment of a fee of

54 guineas, in one sum on entrance, or by instalments of 40 guineas on entrance, and 20 guineas at the beginning of the second winter session.

Sidney Coupland, M.D., *Dean*.

ST. GEORGE'S HOSPITAL, HYDE PARK CORNER, S.W.

Fee for general subjects required for the Diploma in Dental Surgery, exclusive of practical chemistry, £55; payable in two instalments: first year, £30; second year, £25.

Isambard Owen, M.D., *Dean*.

ST. MARY'S HOSPITAL, PADDINGTON, W.

Entrance fee to the general hospital practice and lectures required for the examination in Dental Surgery at the Royal College of Surgeons, England, £55; payable in two instalments:—First year £30; second year, £25.

G. P. Field, *Dean*.

ST. THOMAS'S HOSPITAL, ALBERT EMBANKMENT, S.E.

The fee for attendance on the general subjects required of students in dental surgery is, for the two years, £95; or by instalments, £55 for the first year, and £15 for the second year. If certificates for *dental* practice are also required a special fee for that subject has to be paid.

G. H. Makins, *Dean*.

WESTMINSTER HOSPITAL, BROAD SANTUARY, S.W.

The fees for the general surgical practice and lectures required for the dental diploma of the Royal College of surgeons may be paid in one or two ways, viz.—1. In one payment on entrance 50 guineas. 2. In two payments of £30 and £26, to be made respectively at the commencement of each academic year. These payments include the library fee, and entitle the students to attendance on the tutorial classes. A scholarship value £20 is offered for competition to commencing Dental Students.

W. G. Spencer, *Dean*.

UNIVERSITY COLLEGE, GOWER STREET, S.W.

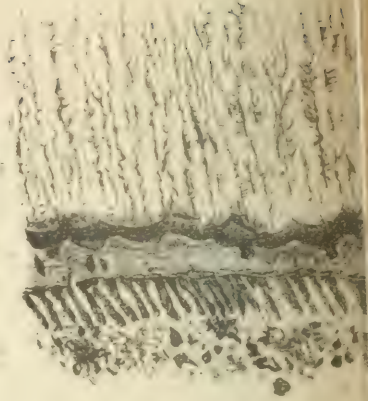
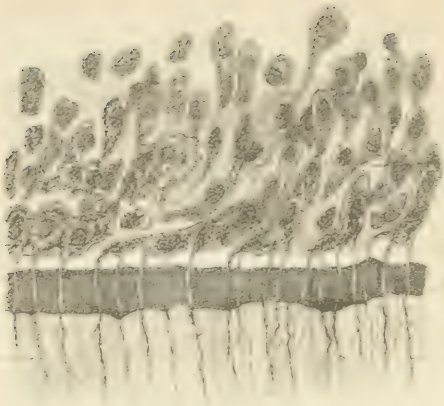
The fee for the courses required to be taken at a medical school for the L.D.S. is 50 guineas; or including Chemistry, Practical Chemistry, Physics and Materia Medica, 65 guineas.

V. A. H. Horsley, *Dean*,

SCHOOL OF MEDICINE, EDINBURGH.

The fees for the general subjects (including practice at the Royal Infirmary) required of dental students, according to the curriculum of the Royal College of Surgeons of Edinburgh, amount to £38 10s.

R. N. Ramsay, Royal Bank, 24, Forrest Road, *Secretary*.



Description of Plate V.

Fig. 1.—Longitudinal section through the dentine organ of a pup at birth, hardened in Müller's fluid and alcohol: cut on a microtome: stained hæmatoxylene: $\frac{1}{4}$ in. objective and C ocular: shows (*a*) layer of odontoblast cells: (*b*) thick processes of odontoblasts at apex of dental papilla: (*c*) thin processes producing thinner fibrils: (*d*) undeveloped odontoblasts and dentogenetic cells of pulp: (*e*) homogeneous matrix in which cells are imbedded: (*f*) formed but uncalcified dentine: (*g*) calcified dentine matrix: (*h*) dentinal tubules.

Fig. 2.—Transverse section through the uncompleted apex of root of a tooth, from a photograph by Mr. Howard Mummary (*see* "Trans. Odonto. Soc.," Vol. XXII., No. 7, Plate 11, Fig. 2), $\times 170$: prepared by Weil's process: shows (*a*) odontoblasts with square extremities: (*b*) dental pulp: (*c*) formed but uncalcified dentine, showing manner of its deposition: (*d*) dentine.

Fig. 3.—Longitudinal section through the enamel and dentine organs in the incisor region of the mandible of a foetal pup: prepared as in Fig. 1: stained hæmatoxylene: $\frac{1}{8}$ inch and A ocular: shews (*a*) pulp: (*b*) odontoblasts: (*c*) ameloblasts: (*d*) cells of stratum intermedium: (*e*) commencement of formation of dentine and enamel: (*f*) stellate reticulum: (*g*) cells forming dental sac, its inner portion: (*h*) its outer portion.

Fig. 4.—Transverse section of the pulp of an adult canine (human), at the broadest part of the cervical region, prepared by author's process: stained rubine: $\frac{1}{12}$ inch and C ocular: shows (a) odontoblasts: (b) their basal poles: (c) their median poles: (d) their distal processes: (e) dentine matrix: (f) dentine tubules: (g) fine network formed by the "supporting fibres" of the pulp.

Fig. 5.—Transverse section of same at the narrowest part of the pulp cavity: preparation and stain as above: $\frac{1}{6}$ inch and C ocular: shows (a) odontoblasts: (b) pulp: (c) network of fibres apparently connected with the odontoblasts: (d) wide intercellular spaces: (e) dentine.

THE DENTAL RECORD.

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Original Communications.

DENTAL MICROSCOPY.*

BY

Mr. A. HOPEWELL SMITH, L.R.C.P.Lond.,
M.R.C.S.Eng., L.D.S.Eng.

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(Continued from page 397.)

ON IMBEDDING AND CUTTING SECTIONS.

THE chief modes of preparing the various dental tissues for histological examination having already been described, it is now necessary to consider the means at the disposal of the student, whereby all soft and softened tissues may be imbedded and cut. The object of the preliminary treatment of specimens by fixing, hardening, and decalcifying reagents, has been to render them fit for imbedding, prior to cutting them into sections on a microtome. When a piece of tissue is imbedded, it is placed in a suitable medium of proper consistency, which is intended to run into and fill all the interstices, not only saturating and impregnating it throughout, but holding its delicate structures in position until a razor or cutter divides it into the thinnest possible sections.

*Object of
Imbedding.*

General Principles.

There are two methods of imbedding—(i.) simple, and (ii.) interstitial.

*NOTE.—The drawings throughout this work are made for the most part, from original photographs.

In the former, tissues are simply fixed in another medium, and mechanically retained until cut. It is useless for dental work, and need not be further considered here.

Interstitial imbedding implies that the substance penetrates into, and is retained within the tissue; and there are three important media for achieving this purpose—gum mucilage, celloidin, and paraffin. Their nature, advantages, functions, and methods of using must now be detailed in particular.

The Employment of Gum Mucilage.

Gum Mucilage

The British Pharmacopœial form of gum solution is most convenient. It can be bought already made, or obtained by dissolving four ounces of “picked” gum acacia in six ounces of water. If carbolic acid, in the proportion of ten drops of a saturated solution to the ounce, is added, tissues prepared for cutting can be kept in the mass all the year round, without undergoing deterioration, loss of water by evaporation being occasionally renewed. A combination of five parts of syrup (one pound of lump sugar to one pint of boiling water) to three parts of mucilage is said to make the impregnation more complete.

Advantages.

Of all imbedding media, gum mucilage is found to be the most useful for ordinary dental microscopical work; it is suitable for nearly every class of tissue. Its merits are many. The preliminary steps—such as it is necessary to perform when specimens are about to be imbedded in celloidin or paraffin—are reduced to a minimum, much time and labour are saved, and the procedure is simple, rapid, and clean. Small pieces of tissue having been soaked in water for some hours to remove all traces of the “preparation” reagents, are placed in a large quantity of mucilage. Here they should

Method of Using.

remain from ten to fifteen hours or more, according to the size of the tissue. The criterion for complete saturation is afforded by the fact that the specimen falls to the bottom of the bottle or jar when it cannot take up any more of the medium. It is then in a fit state to be frozen and cut into sections.

The student, at this point of his work, should obtain the use of an ether freezing microtome. There are several useful varieties; but the beginner cannot do better than use a Cathcart's microtome. It may be said that with this, as with other instruments, practice only will lead to satisfactory results. When once the knack is attained, section cutting becomes a simple and easy matter.

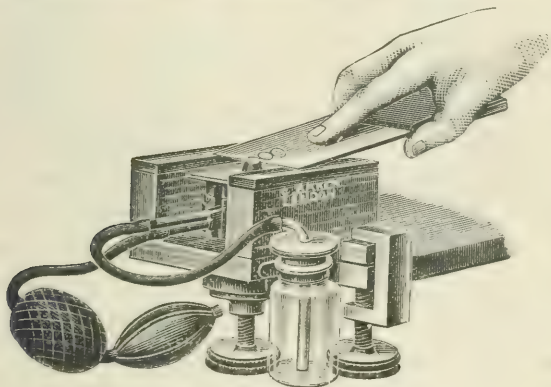


Fig. 6.

CATHCART'S MICROTOME, SHOWING THE METHOD OF USING THE CUTTER, AND THE WAY IN WHICH SECTIONS ARE MADE.

Cathcart's Microtome.

The accompanying figure exhibits the chief points of Cathcart's instrument. It will be seen that the tissue is raised by means of a large differential screw beneath, and that the cutter moves from behind forwards and is not automatic.

Method of Using.—The microtome is clamped to the edge of a firm table, and the bottle half-filled

*To Cut
Sections.*

with ether. Ether sulph. meth. sp. gr. .735, or ether rect. opt. (Etheris Purus B.P.), sp. gr. .720, answers equally well for freezing purposes. A slice of the specimen, not more than $\frac{1}{8}$ inch thick, is now placed in the middle of the plate, and a drop or two of gum mucilage allowed to fall on the top and run down its sides equally in all directions. An assistant should manipulate the bellows, and direct a continuous spray of ether on the under surface of the stage. It may be necessary to add more gum, until at length the object is frozen right through in a solid mass. The plane must be held firmly with the right hand, and rapidly pushed through the specimen, while the left hand slightly moves the milled head at every stroke of the cutter. The sections should collect in a little heap on the upper surface of the plane; if they fly off, or curl up, the tissue is too much frozen, and the assistant must cease using the bellows for a moment, the operator meanwhile breathing gently on the object. The sections should then be carefully removed from the plane by a small wet camel's hair brush, and be dropped into a black vulcanite tray—a photographic quarter-plate developing dish filled with water makes an excellent receiver. Here they will separate of their own accord, in a few minutes. The whole or part of the prepared tissue having been thus sectionised, a piece of ordinary glass is placed over the vulcanite dish to protect the floating sections from dust. They may then be examined at leisure, and the thinnest, *i.e.*, the most transparent, chosen, and placed in a bottle containing 30 or 50 per cent. alcohol until the student has time to stain and mount them.

The cutter should be set and stropped before each time of using, and at the end of the operation

washed with alcohol, and wiped on a rag which has been smeared with vaseline. The microtome also should be wiped dry, and kept in a box to protect it.

The apparatus can be obtained from Baker, of High Holborn.

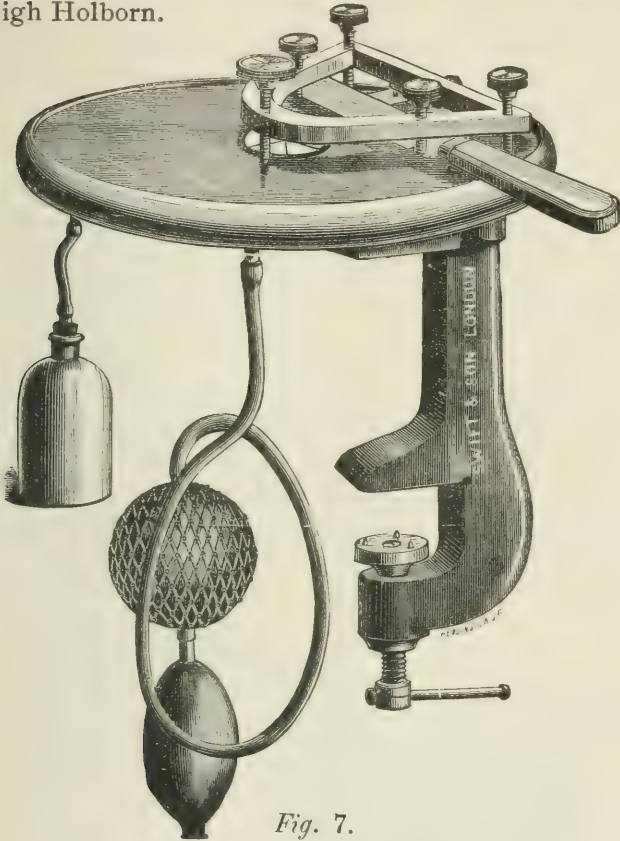


Fig. 7.

SWIFT'S ETHER-FREEZING MICROTOME.

A larger and more useful form of apparatus is shown above. This is Swift's modification of Williams' microtome. Here, the cutter, similar in size and shape to a razor, is fastened into a frame, provided with three delicate screws, which regulate the thinness of the sections. The movements are in an opposite direction to those of Cathcart's knife,

viz., towards the operator, who has thus greater control over the cutter. The tissue is firmly fixed, and cannot be heightened or lowered.

Method of Using. Before using this instrument, moisten its upper glass surface with a little water; this makes the cutter frame run quite smoothly. Place the tissue on the stage and freeze as before directed. Hold the frame very firmly with the fingers of both hands, the thumbs being towards the operator; and by means of the right thumb move the anterior screw through a quarter of a revolution or less at each stroke. This requires practice.

*How to Hold
the Frame.*

The sections collect on the knife, and are placed in a tray of water as already described.

*Advantages
of Roy's
Instrument.*

The chief feature of Roy's Freezing Microtome, which is the best and most convenient ether-freezing apparatus made, is that it is automatic. It can also be used for cutting specimens imbedded in celloidin, the slicing movement of the razor being well adapted for this purpose.

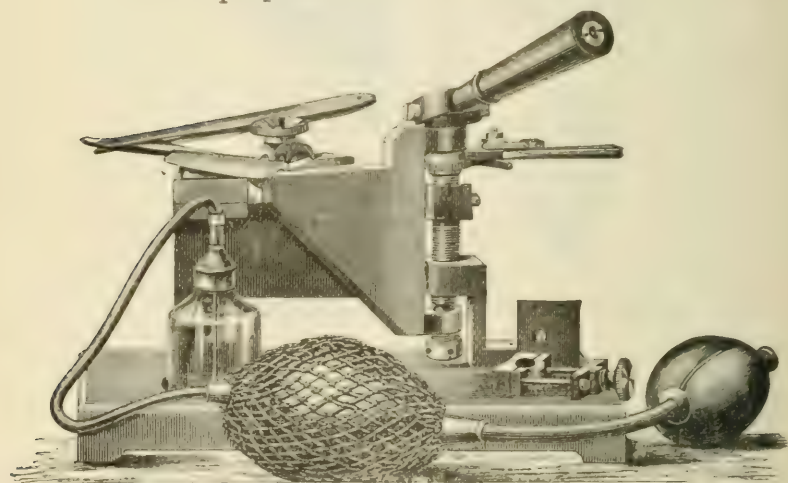


Fig. 8.

ROY'S IMPROVED FREEZING MICROTOME.

Methods of Using.—The razor should be clamped quite near its end, as shown in the cut, and raised to its highest position above the plate. This is done by moving the horizontal brass handle to and fro, the ratchet click engaging with the teeth of the ratchet wheel on the further side of the instrument. The reverse of this will lower the razor, and razor holder. Sections are made by moving the wooden handle backwards and forwards, their thickness depending on the distance that the brass handle is moved at each stroke.

The microtome is made by the Cambridge Scientific Company, and can be highly recommended.

Imbedding in Celloidin.

The employment of celloidin as an imbedding medium for dental tissues, has not received the support of histologists that it deserves. It is an extremely useful agent. It possesses, at once, not only great penetrative power, and equal uniformity of permeation, but is remarkable for the ease with which it can be manipulated.

One finds it most invaluable for imbedding frail delicate organs, whose parts are but loosely held together; such as early embryonic jaws and teeth, decalcified fish's teeth, decalcified teeth with pulps *in situ*, etc.

Celloidin is a preparation of pure pyroxylin, and is merely a patented collodion. Schering's celloidin is the best. It is obtained in the form of thick plates of a tough, gelatinous, semi-transparent substance, which should be cut up into shavings before using.

Steps of the Process.

(A) *Infiltration.* Have ready four glass-stoppered bottles, labelled, and containing (i.) ABSOLUTE

*Modus
Operandi.*

ALCOHOL, (ii.) ALCOHOL AND ETHER, (iii.) THIN CELLOIDIN, and (iv.) THICK CELLOIDIN. For the second bottle make a mixture of equal parts of absolute alcohol and methylated ether. It is difficult to give the exact proportions of the celloidin solutions; they are both made by adding the shavings of celloidin to varying quantities of alcohol and ether. The "thick" solution should be of a thick syrupy consistence, the "thin" being the same diluted with absolute alcohol and ether. The object of using these two solutions is to make certain of getting a complete impregnation of the tissues.

The object having been dehydrated by immersion in absolute alcohol for twenty-four hours, is placed in the second mixture for the same period. It should then be removed and suspended in the thin celloidin, and finally in the thick solution, remaining in each, from one day to one week. The length of time depends on the size of the object.

*Paper Cell
for Imbedding*

(B) *Imbedding.* After thorough infiltration, the tissue is imbedded. Twist a piece of stout writing paper round a small cork, in such a manner that it projects from one end, and makes a collar. Stick a pin through the paper into the cork, and paint the line of junction with celloidin solution. After this is set, fill the paper thimble with thick solution, and suspend the object in the middle of it. Expose it to the air to dry. In a few minutes, a film will form over the surface of the celloidin, and then the paper thimble, with its contents, should be placed in a jar of pure chloroform,* free from water. Here, in one or two days, the celloidin will be thoroughly hardened.

* Many workers use methylated spirit and water instead of chloroform to harden the celloidin block.

Next remove the imbedded object from the chloroform, and tear off its paper support, leaving a clear block of celloidin. Then either place the block in a vial of white oil of thyme, as suggested by Bumpus,* to clear it, or put it at once into the clamp of a microtome. Use for this purpose the clamp supplied with Roy's freezing microtome. (See Fig. 8.) Keep the razor well moistened with spirit or oil of thyme, and take off the sections with a camel's hair brush.

It is better, in the majority of cases, to stain the tissue *en masse*, before imbedding, using borax or lithium carmine (Grenacher's). But some workers † prefer to stain the sections after cutting. The writer, however, considers the other method the better. In any case, sections must be dehydrated again in absolute alcohol, and cleared in cedar-wood oil or xylol, and *not* oil of cloves. They are to be mounted subsequently in Canada balsam.

Staining.

Celloidin imbedded specimens may be cut into sections by freezing on an ordinary Cathcart's microtome, provided they have been hardened in alcohol. The block should be kept in running water for at least one day to remove the alcohol, and then transferred to gum mucilage, and cut after some hours.

Alternative Plan.

Much better sections, however, can be obtained by using Roy's instrument, because of the mowing movements of the razor.

Serial Section Imbedding and Cutting.

If the student intends to do research work, he will find it often desirable to make sections of an organ in series. In dental microscopy this applies

* "Amer. Natur.," Vol. XXVI, 1892, pp. 80, 81.

† Stirling's "Practical Histology," 1893, p. 45.

chiefly to developmental tissues, and pathological conditions of the pulp, or peridental membrane. From what has been already said, it will be at once seen that it is a difficult thing to do serial section cutting, if gum or celloidin are used as imbedding media. Paraffin and a special form of microtome have therefore to be employed.

Imbedding in Paraffin.

*Mummery's
Method of
Imbedding.*

Mr. Howard Mummery advocates the following methods of dehydration and imbedding:—

After the tissue has been fixed and hardened, it is put into 50 per cent. alcohol for two hours, then into 70 per cent. for twenty-four hours, followed by 80 per cent. for twelve hours, and 95 per cent. for two hours, complete dehydration being finally produced by a short immersion in absolute alcohol. Wolrab's bottles, well corked, are very useful for this dehydration process.

"Clearing" is the next step, and cedar-wood oil or turpentine are to be used. Pour some of the medium into a test tube, and on the top put a little absolute alcohol. Carefully place the object in the alcohol, and allow it to sink to the bottom of the test tube, afterwards drawing off the alcohol with a pipette.

The clarifying oil has prepared it for the imbedding medium, which is hard paraffin. A lump of paraffin should be placed in a water-bath, and kept at a temperature of 45° C.—its melting point. The object is placed therein, and it should remain there for one or two days. The paraffin at the end of that time is allowed to cool, and when it becomes hard it can be cut out of the water-bath dish or tray.

*Fixing the
Block.*

The block is fixed on to the object carrier of a Rocking Microtome by melting with a hot knife the

surface of the block and the paraffin already attached to the carrier. When set again, and in position, pare the edges of the block square, and close to the object, set the knife—which should be quite dry—square and cut sections by moving the handle of the instrument rapidly in a lateral direction. A ribbon of sections is thus produced. (*See Illustration.*)

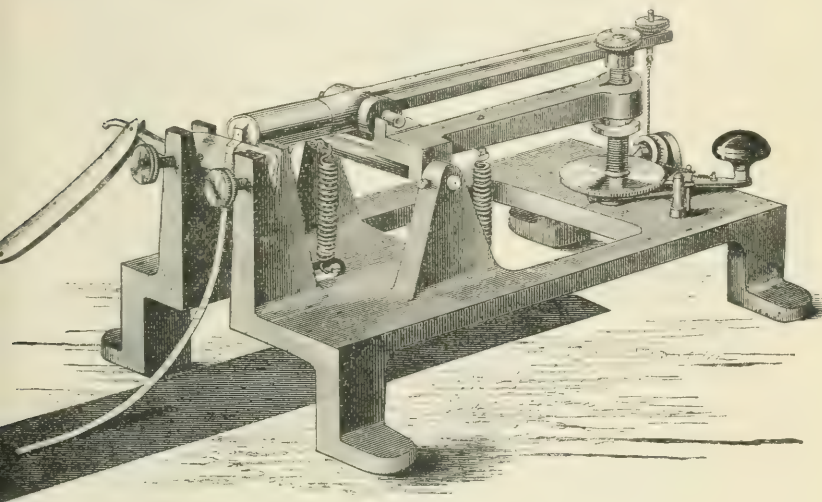


Fig. 9.

ROCKING MICROTOME.

The imbedded sections should be allowed to gently fall on to the surface of warm water in a flat dish, where they quickly flatten out, but still cohere at opposite edges. They can then be stained and mounted by special methods.

The Cambridge Rocking Microtome is automatic, and will cut sections from $\frac{1}{40000}$ of an inch to $\frac{1}{2500}$ of an inch in thickness; these figures of course, being only approximate. It can be obtained from the Cambridge Scientific Instrument Company, St. Tibb's Row, Cambridge; or Swift, of Tottenham Court Road.

Table of Tissues suitable for Imbedding in

GUM MUCILAGE.	CELLOIDIN.	PARAFFIN.
1. The majority of dental tissues, including all soft and softened organs.	1. Developmental tissues. 2. Decalcified fish's teeth. 3. Pulps <i>in situ</i> , especially those of molars and other large teeth.	1. Embryonic tissues, pulps, and peridental membrane, when serial sections are required.

*(To be continued.)***NITROUS OXIDE.***

By GEO. J. CUNDAY.

WE are indebted to our American brethren for many valuable innovations and useful appliances connected with the practice of Dental Surgery. Amongst these must be placed the introduction of the practice of N_2O narcosis.

Although Sir H. Davy had, many years earlier, indicated vaguely the possibility of using N_2O for the purpose of ameliorating the pain incident to the performing of surgical operations, it was not thus utilized until December 11th, 1844; when a dentist of Hartford, U.S.A., named Horace Wells, first demonstrated the potency of this gas to induce insensibility to pain during the extraction of a tooth.

On the evening of December 10th, 1844, Wells went to a lecture given by an itinerant mesmerist, who included in his program, the giving of N_2O to persons in sufficient quantity only, to bring about an excited and semi-intoxicated state. Having become interested in the phenomena thus exhibited, Wells with several others arranged with Colton, the lecturer, for a private seance the next day. On this occasion it was observed by some persons present that although the subject struck his legs against the edges of the seats with very considerable force he seemed not to be conscious of any pain therefrom. When the effects of the gas had passed off his knees were found to be severely bruised and bleeding. He, however, averred that he had

* A paper read before the Notts and Derby Dental Society.

not previously felt any pain. Wells was powerfully impressed by this incident, and having himself a troublesome tooth, he determined to make trial of having it removed whilst under the influence of the gas. Dr. Riggs, who on this historic occasion was the operator, gives the following account of the event :—" Wells took the bag of gas and sat with it in his lap and I stood by his side ; Wells then breathed the gas until he was much affected by it ; his head dropped back, I put my hand to his chin, he opened his mouth, and I extracted the tooth ; his mouth still remained open some time. I held up the tooth in the instrument that the others might see it, they standing partially back of the screen and looking on. Dr. Wells soon recovered from the influence of the gas so as to know what he was about, discharged the blood from his mouth, swung his hand and said, 'A new era in tooth-pulling.' He likewise said 'it did not hurt him at all.'" Thus was this popular anæsthetic introduced into Dental Surgery, although for the two succeeding decades it can only be said to have remained within the threshold. Then it came into general, and indeed world-wide use. And it is now regarded as a nearly absolutely safe and indispensable anæsthetic agent. So comparatively innocuous is it that even most respectable practitioners consider the attendance of a medical man during its exhibition to be superfluous.

I do not know of a single death which can be absolutely attributed directly to the inhalation of N_2O . There have been, it is true, deaths associated with its administration, but in almost every case on post mortem examination some other condition has been found sufficient to account for the fatal result. We are therefore fully justified, in my opinion, in regarding N_2O as being perfectly safe for the average patient. In fact we may believe without fear of erring that it is far less dangerous to inhale N_2O than it is to travel in an ordinary railway train.

Its administration should not however be attempted single handed ; although the assistant need not necessarily be skilled. Improved apparatus has made the giving of the gas and the extraction of the teeth when done by the same operator a much easier matter than it used to be, and very trifling help is sufficient to successfully administer this anæsthetic and to extract the teeth. Writers upon anæsthetics have always attached great importance to the advisability of having at least a third person present during

narcosis, and in the interest of both the anæsthetist and patient, too much cannot possibly be made of this point. It is to say the least extremely foolish and hazardous to neglect it.

Nitrous Oxide is a colourless, transparent, but faintly odorous gas, having a sweetish taste. It was discovered by Dr. Priestley in 1776, and we hear nothing further about it worth mentioning until Sir H. Davy, in 1801, publishes his experiments, in which he states his belief in the efficacy of N_2O to produce insensibility to pain.

N_2O is usually obtained by decomposing Ammonium Nitrate which when raised to about $390^{\circ}F.$ yields N_2O and water. The gas is capable of supporting combustion at high temperatures, nearly as brilliantly as Oxygen. It may be liquified by a pressure of 50 atmospheres at $40^{\circ}F.$, and Faraday is said to have been the first to do this. It is mostly used by dentists in this state, put up in iron or steel cylinders or bottles, which before being sent out, are tested by pressure far exceeding that to which they are exposed in storing the gas. N_2O will in this form keep for an indefinite time and is securely free from contamination. One ounce of liquified N_2O is converted on liberation into $3\frac{1}{2}$ gallons of gas. The gas may be safely given to almost all classes of patients. Stocken remarks that "It is contra-indicated in advanced visceral disease, and in atheroma of the blood vessels." Coleman says, "Those with weak and fatty hearts must ever be unsafe subjects for gas or other anæsthetics, though probably they have been given to many thousands of such unknowingly. Should we have a knowledge or suspicion that we have to deal with a patient so circumstanced, not from the patient's assertion, for nearly half of the patients to whom we administer Nitrous Oxide tell us that they believe there is something the matter with their hearts, we should . . . pay special attention to the conditions of the pulse." Pregnancy nor Phthisis is inimical to the exhibition of the gas: but when the former is well advanced I personally prefer to administer it at the patient's residence and in the presence of the family medical attendant. It is found, however, that patients who have recently suffered exhausting pain, especially highly nervous and hysterical females, cause more anxiety to the anæsthetist in recovering from the effects of the narcotic than others. Recovery sometimes in these cases being retarded by extreme languor which lasts variable periods, but only very exceptionally for so long as twenty minutes.

To secure good results with this agent the patient should not have taken food more recently than two hours before the operation. While on the other hand it is quite as necessary to guard against a too prolonged abstinence and its consequent exhaustion.

The patient being seated in the chair must be requested to loosen the fastenings around the throat, and either corset or band likely to be in any degree tight round the body ; if he wear an artificial plate this should be dispensed with for the time. If the patient's face be bearded the parts which will be touched by the face-piece must be soaped, as it is of the first importance to thoroughly exclude the air during the inhalation of the gas. These details having been attended to the operator will next examine carefully and painlessly the mouth, and impress upon his eye the exact positions of the teeth and roots which he wishes to remove. He will not, however, promise his patient to do everything that may be necessary to be done, but will wisely content himself by undertaking to do the best he can.

A suitable gag will be required, and here is an open field for personal preference. Some dentists declare by corks, one recommending the particular kind used for wine bottles as being of superior quality, more tough, and therefore less liable to break. Others again like vulcanized rubber props with soft rubber pads ; and others, again, more scientific and ingenious mechanical contrivances. It is only necessary to remark that if a simple prop of any kind be used, a cord and weight should be attached to it in order to prevent it lapsing into the pharynx.

For a facepiece some American practitioners prefer a modification of a plan which was used in England in early gas days. When gas was first introduced into this country it was administered from a detached bag through a glass tube placed in the patient's mouth. The modification now in use in America is of hard rubber, and obviously is called a mouthpiece. This mode of administration has certainly its advantages, as it has also its disadvantages. Against it, we have the inconvenience, and, to the patient, unpleasantness of nasal compression. Whilst in its favour we have the unobscured view of the mouth which it allows.

In regard to facepieces there can, I think, be no doubt that the plain one is the most economical, as it is on the whole most convenient. The valves should be in the stopcock and not in the

facepiece ; the economy by this arrangement being, relatively, considerable.

Connected with the subject of economy in outlay, is economy in labour, the importance of which in gas cases can scarcely be over-rated, and to effect the latter a foot-pedal union (such as I will pass round at the end of my paper for inspection) Edgelow's, or a still newer one (of which I will show you an illustration) Weller's, is necessary. Weller's divides the bottles from each other and supports them by lateral iron flanges.

Before beginning the administration both bottles of gas are turned on, the supply is then entirely under the control of the anæsthetist's foot, both his hands being thus at liberty for other service. If the bottle being used runs out, the foot, without the slightest inconvenience, shuts it off, and the foot key of the other bottle is just as easily turned on. At the close of the operation the empty bottle is disconnected and replaced by a full one. A narrow india-rubber tube connects the union with a bag capable of holding three or more gallons of gas. Another and wider tube leads from the bag to the facepiece, to which it is secured by a stopcock.

The gag having been placed in a suitable position in the mouth, well clear, if possible, of the parts to be operated upon, the foot key is slightly rotated and the bag in two or three seconds becomes distended. My practice is at this point to shut off the gas and accurately adjust the facepiece, then to allow the patient to breathe air for a moment or two before opening the stopcock. The first several inhalations of the anæsthetic impress the organs of taste, its sweetish character being distinctly appreciated. But immediately succeeding this the respiratory tract has a feeling of weight and oppression ; so much is this so at times that the patient will make an effort to push away the facepiece. This sensation is quickly changed to one of comfort and glowing satisfaction. If the inhalation were now discontinued the patient would probably manifest some of those excited features which made so powerful an impression upon Dr. Wells. This stage of stimulation speedily develops into the second or narcotic stage. The brain becomes confused with a dizzy idea of being rapidly and continuously revolved, consciousness is lost, and the narcosis passes into the third, the true anæsthetic stage. The lips are now of a bluish hue, the breathing has become stertorous, and the conjunctiva insensible to the touch. On the

appearance of these signs the operator may begin and, as rapidly as efficiency will allow, conclude the operation, bearing in mind that it is better to do a little well than to attempt too much and risk failure. If any particular tooth has been causing more pain than another of those requiring to be removed, it should receive first attention, in order that there may be no chance of the patient coming to and finding the tyrant still reigning. Otherwise if teeth in each jaw have to be extracted those in the lower should be removed, and afterwards those in the upper, posterior teeth in each maxilla taking precedence of anterior teeth, for if the lower be not taken first, the positions of these will be obscured by the blood dropping from above.

Under N_2O , as indeed under any anæsthetic more than usual care is required on the part of the operator, it being best as each tooth or root is extracted to deposit it outside the mouth, or, owing to the helpless state of the patient, one of them may fall into the trachea and cause serious trouble the result of which no one can foresee.

Recovery is usually very rapid, a matter of seconds, and devoid of unfavourable symptoms. Occasionally, however, females of a highly nervous organization develop some of those features which are more or less peculiar to them, moaning or shrieking aloud. These results need not be regarded with apprehension, they may on the other hand be held to show the activity of respiration. Dizziness and confusion, such as accompany approaching anæsthesia, are often experienced, but as the blood becomes more thoroughly oxygenated these pass away and all the functions resume their ordinary course. Happily dangerous signs very rarely occur under N_2O . Increased lividity of the face, sudden pallor, and especially arrested respiration demand immediate restorative measures. It has been said that if respiration be stopped for six seconds means should be adopted to re-establish it. It will generally be found sufficient to draw the patient forward in the chair to a nearly horizontal position face downwards, at the same time grasping the tongue and clearing the fauces. Should these endeavours not be immediately successful resort must be had to one of the usual methods of artificial respiration, or even mouth to mouth breathing.

The average time required to complete the anæsthesia is said to be about sixty-two seconds, whilst its average duration is about

thirty seconds, the consumption of gas varying from two to eight gallons. The rapid return to consciousness is due to the fact that N_2O does not enter into chemical combinations, but is simply dissolved in the blood, and when its supply is discontinued the lungs very quickly eliminate it from the circulation. To the speed with which the patient becomes affected by the gas is attributed the lack of after effects. And we find that if by any means the time in the initial stages is prolonged sequelæ become more common.

The brevity of the period of N_2O anæsthesia has from the first been a source of inconvenience to the dentist, and has placed a bar upon its use in major surgery, and numerous attempts have been made from time to time to prolong its effects.

It has long been recognised that the length of the anæsthetic period is more or less proportional to the time required to induce it. Or in other words where it takes a longer time to get the patient under the influence of the gas the anæsthesia resulting will be longer. This is doubtless owing to a larger quantity of the gas being taken up by the blood. The administration of pure N_2O may not however be prolonged in order to lengthen the narcotic period, by reason of the simultaneous appearance of asphyxia with that of the narcosis. Air must therefore at this point be admitted, but if necessary, the inhalation may be resumed after the patient has been allowed a few breaths of air. But the procedure has been found to be of little service to the dentist because of the difficulties attending a re-application of the facepiece while hæmorrhage from the alveoli continues.

The combination of oxygen with N_2O to delay the appearance of asphyxial symptoms was first suggested by Paul Bert the eminent Frenchman, and in 1878 he devised a method, which is called after his name, of administering these gases under additional atmospheric pressure by which he demonstrated that the mixture might be given for a long time and yet be quite free from risk of asphyxia. He employed 10 or 15% of oxygen and 85 or 90% of N_2O . Owing to the need of a special chamber in which to administer the combination in order to obtain this result, the method has never come into general surgical practise. And while it promised a good deal to the surgeon, it did not offer very much to the dental surgeon. It was nevertheless a suggestion, and we are indebted to Dr. Hewitt for a distinct improvement upon this suggestion. By the administration

of a small percentage of oxygen with N_2O at normal pressure Dr. Hewitt has shown that a longer anæsthetic period is obtained than with N_2O alone, the extra time being about ten seconds, and he has devised a very elaborate and ingenious apparatus by which exceedingly small quantities of oxygen can be given along with N_2O ; the exact amount of the former admitted at any given time being very uncertain, but still within approximate definite knowledge. Dr. Hewitt claims, and we are obliged, in view of the results of his abundant experiments, to admit his claim, that in this way he gets a slightly prolonged anæsthesia; that there is no stertor; no cyanosis, no jactitation. He does not regard the part played by the oxygen as being that of an anæsthetic, but rather the oxygen is the vehicle of the anæsthetic, supporting respiration and retarding asphyxiation until fuller effects of the N_2O result than it would be possible to obtain without its aid.

While it is from one point of view advantageous to be able to get rid of stertor and jactitation, their absence is the loss of valuable signs of the imminence of the true anæsthetic stage, and reduces the administrator to the necessity of relying entirely upon the conjunctival test, which cannot, I think, be regarded as an unfailing guide. Additional skill is therefore required in the practice of this method, also the range of suitable subjects is more contracted.

Another method having the same object, *i.e.*, to extend the true stage, is that associated with the name of Mr. Geo. Rowell. When describing the administration of N_2O I said that in order to give only the pure gas, the facepiece must be perfectly adapted to the face so as to completely shut out the air. This is necessary as it is quite uncertain how small a dilution of the N_2O with air will prevent anæsthesia. During chloroform narcosis large quantities of air are allowed to be taken in, but with N_2O the case is altogether different, an apparently insignificant leakage of the facepiece will often make the attempt to give it abortive. Air may however be given in many cases, if given with great care and exactness, with the result of extending the anæsthesia. In Mr. Rowell's plan air is permitted to be breathed at intervals during the administration of N_2O by means of a valve, the gas being meanwhile shut off. Only one breath of air is allowed at a time, the first being at the eighteenth or twentieth inspiration, *i.e.*, at the time it is supposed the narcosis has reached the end of the stage of excitement, and then

another breath of air is given at every fifth or sixth succeeding inspiration until the anæsthesia is complete. Mr. Rowell tells us that dexterity in shutting off and turning on the gas is not difficult to acquire. If premonitory symptoms of excitement appear the admission of air must be restricted. Mr. Rowell also does not think it advisable to adopt his method for men owing to the danger of producing exhilarating effects, but finds it valuable with children, girls, and women, especially of the anæmic class. It may however be practised in the case of weakly men, but no air should be given until the anæsthesia is thought to be within five or six breaths of its full development.

The scope of my paper permits me merely to refer to the fact that many years ago Mr. Clover devised an apparatus for supplementing N₂O narcosis by the administration of ether.

I cannot claim to have brought anything new to your notice to-night, but have good grounds to hope from past experience the discussion will make up this deficiency.

NOTHING is more difficult than to get good metal casts of underhung models. In some cases it may be got over by tipping the plaster model, but a simple way, in other cases, is to duplicate the model by means of Woodhouse's composition and then cut off the teeth of the new model, using this for taking the die. This, as a rule, simplifies matters considerably.

MR. ARTHUR TURNER is of opinion that *Creta Præparata* is a better basis for a dentifrice than *Creta Præcipitata*, and for this reason, every particle of the former has been suspended in water by virtue of its own lightness, whereas every crystal of the "precipitata" has been thrown down from a condition of semi-suspension in a solution denser than water by means of its own still greater density. Mr. Turner says: "It may be contended that the precipitated form is not entirely or exclusively crystalline, but it will be admitted that it is composed largely of crystals. The mention of crystalline calcic carbonate makes us think of it in its native form—white marble; and who would think of cleaning a delicate structure with a powder having physical properties in any degree like those of marble?"

THE DENTAL RECORD, LONDON: OCT. 1, 1894.

DENTISTRY AND THE LAY PRESS.

WE have lately been favoured by the receipt of numerous cuttings from the daily press containing letters written by dental men on dental matters. We are indebted to the senders of these newspapers, but we are bound to confess we have risen from the perusal of them, with the question in our mind:—Is it wise in the best interests of our Profession to engage in a wordy warfare in the lay press? We suppose, that those who write the initial letters do so in the hope of enlisting public sympathy on behalf a particular view they wish to forward, the motive being much the same as that of the pugnacious small boy, who, getting the worst of it in a fight, usually begun by him, calls his big brother to his aid, or at any-rate threatens to do so. For the motive must be much the same, to prevail over the present authorities by exhibition of force rather than by show of reason. It is worthy of note that the majority of these letter writers are men more or less displeased with our rulers. They represent them as taking wrong steps in regard to certain matters, and often find in abuse and more or less belittlement of person the subject matter of their theme. We would point out that such discontent can find a far better outlet for its energies in an intra-professional agitation than in any appeal to the public at large. The public is not a competent tribunal to judge the merits of a case on the very impartial statements, which it is possible to make in the letter columns of the daily press. We have no wish to assume that any one letter is written with a desire to mislead, but this, nevertheless, results. Nor is it difficult to understand why, when we remember how difficult it is, in

writing, to actually convey the full scope of our thoughts, and to limit the meaning of our words to this alone; how difficult it is to avoid representing but one view of the question; and how strongly the desire to say something clever tempts one into opinions and expressions, which go far beyond our own convictions. The same faults are doubtless present in professional circles but here is a corrective, absent under other circumstances. In one case the statements are accepted as facts, in the other that, they are received as opinions, to be confirmed or refuted by minds as capable as our own of knowing the truth. It is perfectly true that it is probably open to anyone to refute inaccuracies even though they appear in lay papers, but with what result? In the majority of cases such answers add but fuel to the fire, which fizzles on till the Editor, tired of the matter, refuses further space. It seems to us that hardly, if ever, can letters be called for to other than dental or medical papers on dental matters from dental men, and certainly letters airing alleged or real professional wrongs should be of all things avoided. We would not be taken to mean that any should suffer injustice in silence, let such an one appeal to the proper authorities or put the case before his professional brethren, but let him of all things avoid a letter to the lay press, which can do no good and may do harm.

News and Notes.

THERE is a vacancy at the Dental Hospital of London for an Assistant Dental Surgeon. Applications by Monday, the 8th inst.

THE Evening Classes in Bacteriology at King's College, London, commence on Monday, October the 15th. The Class is held on Monday Evenings from 7 to 9 for a period of nine weeks, Particulars can be obtained of Dr. Hewlett, at the Bacteriological Laboratory.

WE have received a copy of "Notes, Reports and Announcements" by the National Home-Reading Union. The object of this Union is to map out and guide courses of study on various subjects, by this means many of the evils of the present fashion of desultory reading may be avoided. We note that the courses in History and Literature, mapped out for this years' work, cover the interesting period from 1350 to 1660.

ORDINARY casting-sand forms an excellent imbedding material for holding on bands. etc., whilst soldering. It should be mixed with water to about the consistency of thick cream, and applied round the bands, the plate having been previously adjusted on a soldering block. A pointed flame should now play on the sand, at the point furthest from the wax, until the sand is dry; the wax can now be burnt off, borax applied, the whole heated up and soldered. It is important not to melt the wax before the sand is dry, otherwise the parts will get displaced. The sand must also, obviously, be free from fragments of zinc or lead. The advantage of this method, over imbedding in sand or pumice and plaster, is that of ease and speed.

BY-THE-BYE, Catching's Compendium states, on the authority of the *Zahntechnische Reform* that wood ashes give good results as a material for obtaining metal dies. They should be mixed with water to remove all the soluble salts; then dried, sifted and mixed with liquor carbonis detergens.

BY-THE-BYE, what is an "Undergraduate of the Royal College of Physicians?" for so we find a man of some repute styling himself. We have heard of men, who have failed to get more than half way towards the "B.Sc." writing after their names "First B.Sc.," and the public naturally thinking him to be a very superior B.Sc. It seems almost impossible to do more than smile at the man's presumption, but it nevertheless strikes one as a petty proceeding.

INSTEAD of using paraffin for the protection of cement fillings, which scales off as soon as wet, *Items of Interest* says: melt together rosin and wax on a spatula, and pour on the filling after it has stood a few minutes. After a day or two they will take a polish almost like ivory.

Abstracts and Selections.

EXPERIMENTS RELATIVE TO THE FORM IN WHICH ARSENIOS ACID MAY BE BEST APPLIED FOR DEVITALISING THE PULPS OF TEETH.

By W. D. MILLER, M.D., D.D.S., Berlin.

THE question of the action of arsenious acid upon the human economy has long been a subject of investigation among pharmacologists and physicians. Nevertheless, the way in which the complex of symptoms characteristic of arsenic-poisoning is brought about remains to the present a subject of dispute.

According to the theory of Liebig,* arsenic acts upon living tissue in a manner similar to sublimate, the tissue being converted into an albuminate of arsenic; at the same time, of necessity, losing its vitality. This theory received little credence because it does not accord with the most common observations regarding the local action of arsenic, and because all attempts to produce an albuminate of arsenic have thus far failed.

The oscillation theory of Binz,† which has attracted much attention, notwithstanding its ingeniousness seems to meet with a great deal of adverse criticism.

By a series of experiments on animals, Binz arrived at the following results:

1. In the living organism arsenious acid is converted into arsenic acid, and arsenic acid into arsenious acid.
2. These two transformations are brought about in a short time by protoplasmatic tissue, within as well as without the animal body.
3. Those tissues which during life are most affected by the action of arsenic are the ones to most readily give up their oxygen to arsenious acid outside of the organism.

From these results Binz came to the conclusion that the conversion and retro-conversion of these two acids into each other bring about

* Die Chemie in ihrer Anwendung auf Agricultur und Physiologie, 1843.

† Pharmacologie, 2, Aufl., 1891, p. 417.

a violent oscillation of the atoms of oxygen within the protoplasm, and this is the cause of the poisonous action of arsenic. It acts only as the carrier of oxygen.

Binz compares the action of arsenic to the destruction of organic matter by iron in the presence of air and moisture. Ferric oxid gives up an atom of oxygen to the organic matter, becoming thereby reduced to ferrous oxid; but this compound cannot exist in the presence of air and moisture, ferric oxid being formed almost immediately, which then again gives up its oxygen to the organic matter. This process, continued indefinitely, brings about an oxidation or combustion of the matter. In this way iron nails in wood become quite loose in time, and iron-stains eat holes in linen. Husemann,* who is the most outspoken opponent of Binz, points out that in accordance with the oscillation theory arsenic acid should exert the same action or as strong an action upon living tissue as does arsenious acid. This, however, does not agree with the results of experiments or clinical observations.

The discordance of the views regarding the local action of arsenic is still more pronounced. Some designate it as a violent escharotic, others assert that it has no escharotic action whatever. Some claim that it acts only upon diseased tissue. How this opinion was ever arrived at is to me incomprehensible. Some find it to act upon the central nervous system, others upon the peripheral nerves.

In regard to the patho-histological changes brought about by local applications of arsenic, I know of no investigations more worthy of consideration than those of Arkövy:†

"1. As_2O_3 brought into contact with the tooth-pulp acts in the following way: A certain degree of inflammatory hyperæmia, total or partial, depending upon the quantity of the agent applied, sets in; the blood-vessels become expanded, and here have a tendency to thrombosis. This latter effect may also be in connection with embolism of the capillaries, when the agent is quickly taken up into the blood-vessels.

"2. As_2O_3 produces no coagulation of tissue whatever.

"3. It has a specific influence upon the blood-corpuscles, combining with the hæmoglobin to form a compound of arsen-hæmoglobin,

* *Deutsche med. Wochenschrift*, 1882, Nos. 48-50.

† Transactions Internat. Med. Congress, Dental Section, London, 1881.

and of this chemical process there seems to be evidence in the profuse yellowish tinge of the whole pulp tissue, and in the discoloration of blood in several of the blood-vessels.

"4. In nearly every case it is taken up in substantia (in form of molecules) into the blood-ways; when there it produces, besides the above-mentioned changes, granular detritus of the contents and anæmic collapse, shrinkage,—the latter effect being brought about nearly exclusively in cases where greater doses were used.

"5. The bulk of the pulp-tissue—*viz.*, connective-tissue fibres and odontoblasts—undergoes no change whatever; not so the connective-tissue cells, which increase three to four times their normal size.

"6. The special action of arsenic trioxid upon the nerve-elements consists in the following: The neurilemma is only so far influenced that its nuclei are somewhat increased; a more essential change takes place in the axial part, where, after the application of more than one mgrm., granular detritus of myelin sets in, and the axis-cylinder commences here and there to disappear. As a very surprising alteration may be regarded the notchy tumefaction of the axis-cylinder, described heretofore almost only in cases of central lesions,

"7. All these alterations occur in and among normal-looking tissue.

"8. The action of arsenic trioxid is macroscopically exhibited by a brownish-red tinging of the whole or of certain parts of the pulp-body, as well as of the neighbouring dentine and cementum, this latter in cases treated with greater doses.—*viz.*, two to five mgrms. This alteration is most expressed at the top of the crown-pulp and at the apical one-fourth to one third part. This circumstance may be considered as an external evidence of the devitalization being completely attained to."

In view of the results obtained by Arkövy, I thought that I might spare the labour of extending my investigations to the histological changes which are produced by local applications of arsenious acid, devoting my time chiefly to the clinical aspect of the question, and in particular to the question, In what form should local applications to the dental pulp be made?

In applying arsenic to the pulps of dogs' teeth, it is impossible to bring about the same conditions in every case; either the pulp is more exposed in one case than in the other, as it is more wounded, or the bleeding may interfere more in one case than in the other.

Again, the quantity of arsenic applied cannot be *absolutely* the same in all cases, etc.

To eliminate these and various other sources of error, it is necessary to make a large number of experiments, which, as every one knows who has experimented upon dogs, is a matter of great difficulty. Experiments upon pulps have the further inconvenience that it is impossible to study with the naked eye changes which are going on in the pulp *intra vitam*, and which may be of great aid in determining the nature of the process. Chiefly, however, for the reason that my experiments dealt with the comparative action of various forms of the paste, I found it desirable to choose a subject for experimenting upon which was more easily accessible than the pulp of dogs' teeth. A few trials only were made on frogs and rabbits, as these animals soon proved to be ill-adapted to the purpose.

The greatest number of experiments was made on the tails of white mice. This organ presents in so far a similarity to the pulp, as it is comparatively long and narrow, and traversed in the direction of its length by central blood-vessels and nerves.

To make the similarity greater, I passed, in some cases, a glass ring over the tail, fitting closely at the root, to take the place of the constriction at the apical foramen.

Again, in a number of cases I enclosed the tail, after applying the arsenic, completely in a plaster cast. This was accomplished by filling a proper-sized glass tube with a thin mixture of plaster of Paris and drawing it over the tail, or rather drawing the tail into it by means of a thread tied to the tip of the tail. Finally, for this operation, tubes were used which were broken through on one side about an inch from the end. As soon as the cast had hardened, the plaster was removed through this opening sufficiently to expose the tail, at a circumscribed point. The slit was then made, arsenic paste applied, protected by gold foil, and the opening closed with plaster of Paris.

To whatever part the arsenic was applied, the most prominent symptom manifested was the enormous swelling and œdema (except where the tail was inclosed in a cast). Applied in a skin pocket above the root of the tail, the whole rump and the hind legs became intensely swollen and appeared yellowish, and semi-transparent on holding the mouse toward the light.

On incision, a large quantity of yellowish serum escaped. Complete anæsthesia and paralysis of the hind legs usually resulted, the

mice sometimes gnawing them off. Death frequently followed the application, unless very small quantities were used.

When arsenic was applied to the ear, after slightly scraping or cutting it, the ear appeared in twenty-four hours swollen, red, and succulent; later a portion of the ear, or sometimes the whole of the external ear, was thrown off.

In working upon the tail, a longitudinal slit was made through the skin about one-quarter of an inch long, being careful to avoid the blood-vessels, which in white mice are distinctly visible. The skin-flaps were slightly raised and the paste inserted. In twenty-four hours marked swelling extending about one-half an inch in each direction from the point of application, sometimes over the whole tail. In the vicinity of the wound the tissue appeared reddish to bluish-red; farther removed there was sometimes no reddening whatever, the tail appearing swollen, waxy, and œdematous. In forty-eight hours the whole tail was intensely swollen, bluish-red; in many cases the skin was found cracked open and drops of serum exuding. A free flow of serum followed an incision. In seventy-two hours tail blue and wilted (dead). Complete anæsthesia of the greater part of the tail was found to be present in about forty-eight hours.

The action of the arsenic appeared somewhat accelerated in those cases where a closely-fitting glass ring was put on the tail near the root, and the arsenic applied one-quarter to one-half an inch below the ring. These rings were set on the root of the tail with gum arabic or plaster of Paris, and allowed to remain for twenty-four hours before the arsenic was applied. This precaution was taken in order to make sure that the ring was not tight enough to produce any disturbance in the circulation.

In more than forty cases, there was not one in which the action of the arsenic extended beyond the ring.

One of the most pronounced symptoms produced by the arsenic is the œdema. This fact suggests the thought that the death of the pulp might be due in part to a strangulation brought about by the pressure within the rigid walls of the pulp-chamber. If this were the case, we should expect tails in a plaster cast to be devitalized more quickly than when they were free to expand. The experiments did not, however, furnish much evidence in favour of this view. The difference was so slight that I was obliged to repeat the experiments fifteen times before I could come to a conclusion, which is,

that the action of the arsenic is not appreciably influenced by enveloping the organ in a rigid cast. In some cases the action appeared to be more diffuse, in some loss of sensibility appeared to occur sooner, but no constant pronounced difference could be detected.

From these results we cannot, however, with certainty, conclude that the pressure within the pulp-chamber has no part in bringing about death of the pulp, since its effect may be compensated for by a diminished absorption of the arsenic, resulting from the increase of pressure within the tissue. That the death of the pulp is not due solely to a strangulation of the vessels at the apical foramen will be evident from the fact that arsenic acts locally upon tissue that is perfectly free to expand. The action of arsenic is of a progressive nature, beginning at the point of application and extending gradually in each direction. The peripheral portion of the tail, of course, dies *in toto* as soon as a complete stagnation is brought about at the point of application of the paste.

The view formerly entertained by many, that arsenic acts only upon diseased tissue, is untenable.

Arsenic is still described by many as a powerful escharotic, although nearly all who have experimented with it have pointed out that it has no action of the nature of the well known escharotics, such as carbolic acid, chloride of zinc, etc.

The local application produces no immediate visible effect whatever.

It is well known that different tooth-pulps show very great differences in their susceptibility to the action of arsenic. The age of the patient, the size of the pulp, the freeness of the exposure, and particularly the condition of the pulp as to calcifications, have a marked effect upon the rapidity of absorption of the paste, so that, while in many cases death of the pulp occurs within twenty-four hours, in others again repeated applications may be necessary to accomplish the purpose. The rapidity of action naturally depends to a certain extent upon the amount of arsenic applied, and upon the action of the substances with which it is incorporated.

The form in which arsenic was for many years solely applied to the pulp is in connection with creasote or carbolic acid and morphia; in later years we hear much of the essential oils and lanolin as base, with addition of iodoform, cocain, etc., to prevent the pain often attendant upon the devitalizing process.

I have experimented upon mice, and to some extent upon dogs, with the following combinations :

1. Arsenious acid ; chlorid of zinc. 2. Arsenious acid ; carbolic acid. 3. Arsenious acid ; oil of cloves. 4. Arsenious acid ; lanolin. 5. Arsenious acid ; thymol ; oil of cloves. 6. Arsenious acid 1 ; thymol 2 ; oil of cloves. 7. Arsenious acid ; glycerin. 8. Arsenious acid ; 5 per cent. aqueous solution of common salt. 9. Arsenic acid.

In each case a sufficient quantity of the liquid was added to form a paste. No. 9, being deliquescent, soon formed a paste of itself when exposed to the air.

No. 1 applied to the ear produced shrivelling at the point of application, caused by the chlorid of zinc. This prevented the absorption of the arsenic, and consequently the characteristic arsenic effect did not appear at all.

On the tail the *escharotic* action of the *chloride of zinc* was very pronounced, in half-an-hour a white patch having formed one-fourth to one-half inch long and extending half-way around the tail.

At the same time a marked contraction or constriction of the tail was produced. This constriction apparently retarded the absorption of the arsenious acid, the rapidity of action, on the whole, being less than where the mixture No. 2 or 3 was used.

Application of No. 2 to the ear produced more or less redness and swelling, with death of a limited portion of the ear.

No. 3 produced a much more powerful action than either 1 or 2, when the application was made to the ear or to the tip of the tail. When applied under a skin flap near the root of the tail, it did not act so very much more promptly than No. 2, though on an average there was still a difference in its favour.

No. 4 produced but very slight action in all cases ; usually it was little more than zero.

In the *Dental Cosmos* for 1893, page 805, I called attention to the fact that the pain which is so frequently produced by applications of sublimate to the teeth may be in a great degree or entirely avoided by the addition of thymol. This led to the thought that thymol might be a valuable ingredient of arsenic paste.

Experiments were accordingly made with the mixture No. 5. As was anticipated, the action was much milder than that produced by No. 3, since a given quantity of the paste contains only about half to two-thirds as much arsenic as an equal quantity of No. 3. It was,

however, equal to that produced by an application of a mixture of morphia and arsenious acid in oil of cloves, and we have reasons for thinking that the local anæsthetic action of thymol exceeds that of morphia. Many, indeed, deny that morphia has any local anæsthetic action at all. Thymol has, further, the decided advantage of a considerable antiseptic action. At the Dental Institute I have been making use of a paste having the following composition :

R—Thymoli,
Acidi arsenicosi, āā x ;
Ol. caryoph., q s. ut ft. pasta.

We have no reason thus far to be other than satisfied with the results. One disadvantage of this mixture lies in the fact that part of the thymol separates from the arsenic in crystalline form, rendering it necessary to stir the paste from time to time. This difficulty might no doubt be overcome by a slight alteration in the composition of the mixture, possibly by the addition of glycerin.

The effect produced by applications of No. 6 was decidedly less than that by No. 5. Further dilution of the paste was not attempted, although we are perfectly safe in concluding that by increasing the proportion of thymol we may reduce the strength of the paste to any desired effect.

A paste made of arsenious acid with water acted quite as promptly as when oil of cloves was used. Nos. 7 and 8 were tested each only four times. They produced the impression of acting at least as promptly, if not still more rapidly, than the paste with oil of cloves. The action of *arsenic* acid was very marked. A small quantity of this taken upon a glass slide deliquesces immediately, so as to form a thin paste. An amount of this about equal in size to the head of a pin, applied to a slit in the tail of a mouse, caused death in four cases out of five inside of four hours ; paralysis of the hind legs, diarrhœa, and, in one case, convulsions, being the chief symptoms.

Arsenic acid also produced a local escharotic action, similar to that of carbolic acid, though in a much less degree.

In the fifth case, the mouse showed the symptoms just stated to such an extent that it was expected to die at any moment ; it recovered, however, and on the following day appeared perfectly well ; the local action was scarcely visible.

The results recorded above point to the following practical conclusions :

1. The rapidity and intensity of the action of arsenious acid depends, under certain circumstances, to a very considerable degree upon the substance or substances with which it is incorporated.

2. Where there is but a small point of exposure, and in particular where extensive calcification has taken place in the pulp, escharotics should be avoided, since the contraction of the the tissue retards the absorption of the arsenic. This retardation is but slight where there is a broad surface of exposure.

In stubborn cases where applications of the ordinary paste fail to effect the devitalization, a paste consisting of arsenious acid in oil of cloves, glycerin, or salt solution should be employed, undiluted by any third constituent.

3. Thymol is worthy of a trial as a substitute for morphia, on account of its anæsthetic and antiseptic properties.

4. For devitalizing pulps of milk-teeth or remains of pulp-tissue in root-canals, arsenious acid, if employed at all, should be diluted by two to three parts of some other constituent (thymol, oxid of zinc, morphia, iodoform).

In fact, in all cases where, for any reason, a milder action of the arsenic is desired, it may naturally be employed in this diluted form. In these cases Arkövy recommended the use of pepsin for devitalizing the pulp.

The question naturally arises whether results deduced from experiments on mice apply equally well to the pulps of human teeth. It is my impression that such is the case. Nevertheless it would undoubtedly be well to supplement the above experiments by experiments on the pulps of teeth, although it will always be found very difficult to secure the variety of conditions in dogs' pulps which we meet with in the pulps of human teeth. Experiments on nine teeth (three dogs) gave results which fairly correspond with those reported above.

I give the results of my experiments to the profession at this time because I am about to interrupt my work for three months, and do not care to delay so long with the publication.—*Cosmos*.

SWAGED ALUMINUM PLATES.

By GEO. D. SITHERWOOD, M.D., Bloomington, Ill.

ALUMINUM is never found in a pure metallic state. Stocker once made the statement that aluminum occurred as shining scales

in an alumina formation near St. Austel, in Cornwall County, England, but he was in error ; yet there is no other metal which is so widely scattered and occurs in such abundance. Aluminum is found in combination with oxygen, fluorine silicon, the alkalies and acids, existing in such quantities as not only to form mountain masses, but also the bases of soils and clays.

About 1760 Morveau called the substance obtained by calcining alum—alumina. Afterwards when Lavoisier first suggested the existence of metallic bases of the earths and alkalies, and alumina was suspected of being the oxide of a metal, the metal was called "aluminium." This was many years before the metal was isolated. The first practical researches in the preparation of aluminum date back to 1807. Oersted in 1824 decomposed anhydrous aluminum chloride by potassium amalgam, and obtained along with some potassium chloride, an amalgam which when decomposed by heat furnished him a metal resembling tin. In 1827 Wöhler isolated it by decomposing aluminum chloride by potassium ; the metal was in the form of a gray powder, taking the brilliancy of tin under a burnisher. In 1845 Wöhler obtained the metal in small malleable globules of metallic appearance, by making vapour of aluminum chloride pass over potassium placed in platinum boats, but the metal thus obtained was very impure and scarcely as fusible as cast iron, being no doubt alloyed with the platinum in its preparation. It is to H. St. Claire Deville that the honour belongs of having isolated aluminum in a state of almost perfect purity, determining its true properties in 1854. If Wöhler was the discoverer of aluminum, Deville was the founder of the aluminum industry. On March 20th, 1854, he announced to the French Academy in a letter to Dumas that he had produced aluminum without alkaline help, by the battery, and sent a leaf of the metal thus obtained. Bunsen succeeded in obtaining aluminum by the battery about the same time by a method similar to Deville's. Thus it is evident that the isolation of aluminum by electrolysis was the simultaneous invention of Deville and Bunsen.

At the beginning of 1855, Deville established himself at the chemical works at Javel, in France, in a large shed which the director M. De Sussex kindly put at his service. Such success attended his efforts here that on June 18th, he presented to the Academy through M. Dumas large bars of pure aluminum, sodium

and masses of aluminum chloride. The expense of all the experiments and work at Javel by which Deville was enabled to place the aluminum industry on a firm basis, was borne by the Emperor Napoleon III. So it seemed fitting that the first article made of aluminum was in compliment to the emperor, a baby rattle for the infant Prince Imperial, the Prince who afterward fell in a battle with the savage Zulus of Southern Africa. It was the metal made at Javel under the direction of Deville which was exhibited at the Paris Exposition in 1855. He had for his assistants two young men, Charles and Alexander Tissier. After assisting him for about two months in setting up his apparatus they were forced to leave the works on account of a misunderstanding between them and M. de Sussex. They were admitted to Deville's laboratory at the Ecole Normale, and initiated by him into all those processes which they made use of afterward, then suddenly left, taking drawings of furnaces, details of processes, etc., which they not only made free use of, but even patented. In July, 1855, M. Chann, an honourable manufacturer of Rouen, established works in which Deville's processes were to be applied, and intrusted the direction of it to the Tissier brothers. In 1858 the Tissiers wrote and published a small work entitled "*Recherchés sur l'Aluminium*," which in view of what Deville could have written about the subject was a decided misrepresentation of the results thus so far accomplished. Deville thought the industry was yet too young to merit any sort of publication, but the Tissier's book no doubt stimulated his efforts in writing his noted work "*De l'Aluminium*," in 1859, in which he acknowledges the writing was due to his pride wherein he decided to take the pen to speak of his work "only to avoid seeing it belittled and disfigured." He concludes his book with these words: "I have tried to show that aluminum may become a useful metal by studying with care its physical and chemical properties, and showing the actual state of its manufacture. As to the place which it may occupy in our daily life that will depend on the public's estimation of it and its commercial price. The introduction of the new metal into the usages of man's life is an operation of extreme difficulty. At first aluminum was spoken of too highly in some publications, which made it out to be a precious metal; but later these estimates have made it out attackable by pure water. The cause of this is the desire which many have to see taken out of common field-mud a metal superior to silver itself;

the opposite opinion established itself because of very impure specimens of the metal which were put in circulation. It seems now that the intermediate opinion, that which I have always held and which I express in the first lines of my book, is becoming more public and will stop the illusion and the exaggerated beliefs which can only be prejudicial to the adoption of aluminum as a useful metal. Moreover, the industry, established as it now is, can be the cause of loss to no one; and as for myself, I take no account of the large part my estate which I have devoted, but am only too happy, if my efforts are crowned with definite success in having made fruitful the work of a man whom I am pleased to call my friend—the illustrious Wöhler."

Beauxite and cryolite are the minerals most used for producing aluminum, and their preference lies mainly in their purity. I have here some fine specimens of beauxite, a hydrated aluminum oxide its formula being $\text{Al}_2\text{O}_3 \cdot 2\text{H}_2\text{O}$ which came from Little Rock, Arkansas. Beauxite until recently has not been found in the United States, but in 1887 a deposit was discovered in Floyd County, Georgia, which contains titanitic acid and resembles the mineral found in Asia Minor. It varies in colour from light salmon to dark red according to the admixture of iron sesquioxide. This beautiful specimen is from Georgia; it is also found in Alabama. It was first found in France near the town of Beaux, hence its name. Large deposits are found in other parts of France. It is also found in Austria at Freisstritz and Wochein in Styria where it is called Wocheinite. Deposits similar to those of France are found in Ireland at Irish Hill, Strait and Glenravel. Deposits are also found in Hadamar in Hesse, at Klein Steinheim Langsdorff and in French Guiana. Cryolite, aluminum sodium fluoride, was first found in Ivigstuk in Arksut Fjord, West coast of Greenland, where it constitutes a large bed or vein in gneiss. It is a snow-white semi-transparent mineral when pure. It is fusible in the flame of a candle, and on treatment with sulphuric acid yields hydrofluoric acid. Its first use was by the soap-makers for its soda and is still used for making soda and alumina salts, and to make a white glass which is a very good imitation of porcelain. The specimen exhibited is from Greenland, its formula being $\text{Al}_2\text{N}_6\text{F}_{12}$. The only known deposit of cryolite in the United States is that found near Pike's Peak, Colorado, where it occurs in small masses as a

subordinate constituent in certain quartz and feldspar veins in a country rock of course reddish granite. Here is also a specimen of kaolin, white china clay, from Aiken, S. C., its formula being $\text{Al}_2\text{O}_3 \cdot 2\text{SiO}_2 \cdot 2\text{H}_2\text{O}$. This piece of corundum, aluminum oxide, is from Buncombe Co., N. C., its formula being Al_2O_3 . The small specimen of gibbsite, a hydrated aluminum oxide is from near Seidersville, Lehigh Co., Pa., its formula being $\text{Al}_2\text{O}_3 \cdot 3\text{H}_2\text{O}$. The beautiful piece of diaspore, also a hydrated aluminum oxide, is from Chester, Mass., its formula being $\text{Al}_2\text{O}_3 \cdot \text{H}_2\text{O}$. Of these minerals, beauxite, cryolite and kaolin are the commonest. Corundum is valuable as an abrasive, while the other two, gibbsite and diaspore, are comparatively rare; if they should ever be discovered in a large amount they would be very valuable as aluminum ores.

In the reduction of aluminum many processes are in vogue. Deville succeeded in reducing it by electricity in 1854, as previously mentioned, but the expense was too great with the methods of generating the current at that time, therefore he adopted what is known as the process of reduction by potassium or sodium, which is still carried on with the latest improvements at Nanterre, in France. In the United States the electrolytic process is used by The Cowles Electric Smelting and Aluminum Company, of Lockport, N.Y., where a great water power drives their immense dynamo.

The Pittsburg Reduction Company, who have works at New Kensington, Westmoreland Co., Pa., and Niagara Falls, N.Y., also use the electrolytic process under the patents of Mr. Charles M. Hall. They manufacture a very pure metal, which is guaranteed ninety-nine per cent pure. The plate here exhibited is of their manufacture the dentures were also swaged from some of the same metal. There are many other methods of reduction, but time will not be taken to name them, much less to describe a single one of those already mentioned. Ludwig Grabau, of Hanover, Germany, a patentee of a process for the reduction of aluminum fluoride by sodium, the principal object of which has been to produce metal of a very high degree of purity, where every precaution is taken to procure pure material and prevent contamination during reduction, said in a paper written in 1889: "The purifying of impure aluminum is accompanied by so many difficulties that it appears almost impossible. It is, therefore, of the greatest importance to so conduct the

operation that every impurity is excluded from the start. Molten aluminum compounds, whether a flux is added or not, attack any kind of refractory vessels and become siliceous if these vessels are made of chamosite or like materials, or if made of iron they become ferruginous. These impurities are reduced in the further processes and pass immediately into the aluminum as iron, silicon, etc. Evidently the case is altered if an aluminum compound, which is infusible can be used advantageously. Aluminum fluoride is infusible and also retains its pulverized condition when heated up to the temperature needed for its use ; it can therefore, be heated in a vessel of any kind of refractory material or even in a metallic retort without danger of taking up any impurity."

Much of the commercial aluminum which dentists attempted to make plates from twenty-five years ago contained from two to three per cent. of silicon and from five to eight per cent. of iron, with traces of sodium, copper, lead and other impurities, which under the most favorable conditions resulted in disintegration. The iron in the metal oxidized in the fluids of the oral cavity leaving holes and fissures in the plate.

The cast plates of so-called aluminum are never made of even commercially pure metal on account of the shrinkage, which is $\frac{1}{4}$ of an inch to the foot, but are in fact aluminum alloys. One of the best known, that of Dr. C. C. Carroll*, contains :

Aluminum.....	90 to 93 parts.
Silver	5 to 9 "
Copper	1 "

This alloy when cast under slight atmospheric pressure, which may be obtained by a continuous current of air from a bulb-blower, gives perfect castings, is very white and easy to work. The addition of copper reduces to a minimum the shrinkage of the alloy, also giving it a closer grain. It is claimed that the introduction of five per cent. of silver benefits the metal—considerably increasing its hardness, capability of polish, making it whiter, denser and stronger. This small piece of plate and the ingots exhibited contain five per cent of silver, and were produced by the Cowles E. S. & A. Co., at Lockport, N. Y. It is much harder than pure aluminum, and not so malleable.

* U. S. Patent 373,221, Nov. 15, 1887.

Cast alloys containing not more than 95 per cent of aluminum show, a crystalline structure, break short, and with a tolerably level surface.

The commercial metal, which is probably 98 or 99 per cent. pure, may be forged and rolled with as much perfection as gold or silver. Its fibrousness is greatly increased by hammering and rolling; it also becomes sensibly harder after being worked, probably owing to the closing of the grain; its density is also increased. Commercial aluminum may be readily tested with a knife; if quite pure it cuts smoothly, the shavings turning up similar to pure tin, yet 95 per cent. metal can hardly be cut at all, the shavings break off short and a fine grating is felt through the blade. Pure aluminum stands third in malleability, being exceeded only by gold and silver. In induction it stands seventh, gold, silver, platinum, iron, very soft steel and copper coming before it. Sheets of the metal are rolled down to 0.0007 of an inch in thickness and beaten into leaf as thin as gold-leaf. Its electrical conductivity is about 55, taking that of silver at 100, but is practically non-magnetic. Is easily and readily welded by the electric process of Prof. Thompson. The soldering process has proven more difficult, yet there are a number of solders used successfully. A very good solder is formed of 45 parts tin and 10 parts aluminum, applied with a common soldering iron, without flux or preparation of the pieces further than having the parts to be united filed or scratched to a clean, bright surface. Mr. Joseph Richards,* of Philadelphia, makes a good solder for use with the blowpipe or with the iron. The formula is unknown to me, but is similar to the one mentioned except it contains phosphorous for its own flux. Here are some samples of the solder. It has been in use in Europe for more than a year, and is pronounced by Dr. Kiliani, the metallurgical expert and chemist of Berlin, as the only successful solder yet discovered. It is the solder used in the manufacture of canteens and helmets and various accoutrements for the German army.

MANIPULATION FOR DENTAL PLATES.

In making swaged plates take the impression in plaster, making a perfect model in plaster, varnishing with sandarac varnish, which you can easily make by dissolving gum sandarac in alcohol in sufficient quantity to make a ready flowing varnish. Where there is

* U. S. Patent 478,238 July, 1892.

much undercut it is best to make a few detachable pieces with plaster and asbestos, leaving the outside shaped in such a manner that it will readily withdraw from the sand, and the small pieces be replaced in the mold.

For molding use good molder's sand mixed with one-third marble dust, sifted clean and made quite moist with water, which is preferable to oil, as the mould is soon warmed and dried sufficiently over a gasoline or gas stove. For dies use zinc, as the shrinkage is an advantage in making certain compensations which are conducive to a closer adaptation of the plate. For the counterdies use lead, making two for each case. Before pouring the lead on the die, cover it over with whiting and water mixed to the consistency of cream, and warm it before pouring. Make a pattern in the usual way with tin or lead foil. Now take a piece of aluminum plate of sufficient size rolled to No. 19 B. and S. gauge, anneal it over a large alcohol flame, or Bunsen burner, cleanse the surface with sulphuric acid and boiling water, and immediately dip in a solution of bicarbonate of soda, and thoroughly wash with warm water and soap, using the brush. Dry, and run through the rollers, setting them close enough to bring it to No. 20; but just before rolling place on the plate a piece of fine ricenet with plenty of sizing, passing it through with the metal which gives the fine network surface noticed. People who wear the plates say the network surface feels more pleasant and adheres better than a smooth one, besides, there is never any occasion for the depression known as an "air chamber."

In swaging use horn mallet and smooth pliers, always keeping a piece of thin tissue paper between the plate and die, also between the counterdie and plate. The tissue paper is a great protection in keeping the plate clean, as there is always danger of driving small particles of zinc or lead into the texture of the plate. It must be frequently annealed, being careful not to overheat, bearing in mind that the melting point of aluminum is about $1,150^{\circ}$ F. If the plate is heated quite hot and dropped in cold water it becomes very soft, but at the same time will lose its elasticity, which is undesirable; it should be left to cool gradually, as when worked thus it will be elastic like coin gold. A German firm engaged in making aluminum states that by long gradual cooling from a red heat, aluminum can be made so elastic that it can even be used for

hair springs for watches. After it is well adjusted to the die, the rim for either upper or lower denture is turned with a pair of pliers with smooth surface on the bite, and beaten down with the mallet, driving it home in the second counterdie without any paper.

The plate is now tried in the mouth and trimmed where necessary to a perfect adaptation, a rim of softened wax placed on it and the bite taken. It is then placed on the articulator and the teeth set up, using either gum or plain according to the operator's choice, attaching the teeth with wax in the same manner as for rubber attachment for a gold plate. In order for a perfect articulation it is necessary to again try in the mouth. When the teeth are satisfactory, and properly placed, mark the plate with a sharp pointed instrument at the margins of the wax, and flask with plaster in a regular vulcanite flask.

Separate the flask after warming it, remove all the wax with spatula and boiling water, and also carefully remove the plate cleansing it with boiling water. Next place the plate on the die, and supply some lubricant as turpentine and sweet oil, or stearic acid one part and turpentine four parts. Apply on the portion to be etched which is represented between the lines marked before the removal of the wax, this will prevent the tool from sliding and cause it to cut as readily as into pure copper. The etching is made with chisel and hammer, an assistant striking while you hold the plate firmly on the die, and move the chisel as desired almost in the same manner as specified in the patent of Dr. A. Clark. In his method no rim was turned and the etching was all the same, making rows turned in opposite directions. In my method the first row is made with a straight edge chisel about 3 millimeters wide, turning the handle of the chisel outward, this forms a line of etching that will effectually prevent the thin edge of rubber lifting from the plate; the remaining part is etched in rows around the plate, making each row by leaning the chisel in the opposite direction. A turning chisel with a bevel edge about 5 millimeters wide is suitable for this, being careful not to drive the point through the plate. The rim is opened a little before etching so the rubber will pass under the turned over portion. After the etching is completed drive the margins up to the die with a piece of hard wood as the etching process will cause a little spreading of the plate at some points. Now place the plate in a porcelain or china bowl, and

pour on it about half an ounce of full strength sulphuric acid, adding four times as much boiling water ; in about a minute remove and plunge in strong solution of bicarbonate of soda, rinsing and brushing in clean water with a little soap. If not bright and clean repeat the process. When dry varnish all that portion not etched with a good coat of sandarac varnish. As soon as the varnish is hard replace the plate in the flask and pack the space around the teeth with pink or red rubber, in quantity sufficient, heat and close the flask and vulcanize one hour and thirty minutes at 320° F. or 85 lbs. steam gauge. The sandarac varnish protects the plate, keeping it bright and clean, and is readily removed afterwards with a little alcohol. In polishing, the rubber attachment is filed and dressed with scrapers and polished in the usual way, being careful not to cut or scratch the metal portion of the plate. Aluminum will take and retain a very high polish, but the use of old means is not effective, as the bloodstone and burnishing iron tear the metal as fine stone does glass. In the absence of any special polish the ordinary cold brass polish will be found very efficient if ground fine enough. The Pittsburg Reduction Co. furnish an excellent polish consisting of stearic acid 1 part, Fuller's earth 1 part, and rotten stone 6 parts, the whole ground very fine and well mixed. They give it the name "Almeta Polish." A sample of it is exhibited.

The best means of burnishing is to use on the lathe a piece of soft wood made in the shape of a cone, and soaked in olive oil ; this closes the grain of the plate and gives a most brilliant polish. For full upper dentures there is no better material than aluminum, and for the small partial plates it is especially desirable, for lower sets where the ridge is much absorbed its lack of weight seems to require some stay. Have made one set with the Steadman springs which are very satisfactory. You will observe the method of placing them in the set exhibited, the spring posts hold both plates very firmly in place. Where there is a good alveolar ridge no stay or spring is required, the lower plate remaining in place without any mechanical device. For small sections held in place with broad clasps of aluminum, annealed in the manner mentioned in order to retain sufficient elasticity, it offers very large possibilities, as these can be placed in the mouth at a moderate expense, frequently serving the purpose of expensive bridgework, although these clasp plates are not recommended, only in some exceptional

cases. The clasps may be soldered to the plate, fastened with the rubber attachment, or fashioned from the plate itself like this sample. There has been a patent granted for taking the impression for such cases with the clasps on the teeth, similar to Dr. Noble's method mentioned in Harris' work, or some similar process, but all infringement is avoided by taking impression and making the small die with Babbitt metal or something similar, as no shrinkage is desirable here. The piece is swaged from plate No. 22 B. and S. gauge; the articulation, attachment, flasking, vulcanizing, and finishing all being the same as for full plates. For appliances in orthodontia aluminum is vastly preferable to any cheap metal yet offered in place of gold or platinum. Very erroneous statements with reference to the chemical properties of aluminum have often been published. Air, wet or dry, has no action on it. Water has no action either at ordinary temperature or at the boiling point, 212° . Aluminum leaf, however, will slowly decompose water at 100° . Sulphuretted hydrogen exercises no action, as may be proven by leaving the metal in an aqueous solution of the gas. Sulphuric acid diluted in the proportion most suitable for attacking metals which decompose water has no action; and contact with a foreign metal does not help, as with zinc, which fact tends to remove aluminum considerably from those metals. Concentrated sulphuric acid dissolves it rapidly with the aid of heat, disengaging sulphurous acid gas (SO_2). Nitric acid concentrated or weak does not act on it at ordinary temperature. In boiling nitric acid, solution takes place very slowly. Hydrochloric acid weak or concentrated dissolves the pure metal very slowly. Hydrochromic, hydriodic, and hydrofluoric are said to act very similarly to hydrochloric. Acetic acid, or a mixture of acetic and common salt in solution with water has a slight action which is almost inappreciable if the metal is pure. Aqua ammonia acts very slowly, producing a little alumina. Strong alkaline solutions act with great energy on the metal, transforming it into aluminate of potash or soda. However, it is not attacked by caustic potash or soda fusion. Tissier found that aluminum may be made to unite with mercury merely by the intervention of a solution of caustic potash or soda. If the surface of the metal be well cleaned or moistened in with the alkaline solution it is immediately melted by the mercury and a shining amalgam forms on the surface. The aluminum in its amalgam is very easily acted upon and behaves like a metal of the

alkaline earths, which is interesting to aluminum amalgam advocates. Recent experiments by Prof. George Lunge, Ph.D., in which tests were made by immersing aluminum in coffee, tea, beer, wine, and many acid solutions, confirm the chemical properties first mentioned, with many others, proving that no metal to be worn in the mouth other than gold, is less acted upon by food, liquids or the secretions of the oral cavity. Due acknowledgment is made to Prof. Joseph W. Richards, of Lehigh University, Pa., for much valuable data in this paper. His work is the only one which presents a systematic treatise on aluminum, in the English language, and ought to be in every dentist's library.—*Dental Review*.

REMOVAL OF DEVITILIZED PULP.

By H. H. SILLIMAN.

AFTER removal of arsenic, wipe out with a fresh solution of dialyzed iron, and place in the cavity a small pellet of cotton saturated with a saturated solution of tannin in glycerine; seal it with gutta-percha. After ten days the pulp may be removed whole without pain and without hæmorrhage.—*Office and Laboratory*.

WATCH OR CLOCK OIL.

By A. C. HEWETT.

TAKE of prime salad or table oil, in a bottle, say, one pint. Lead, in sheet form, one-sixteenth of an inch thick, or less, from which cut strips a little shorter than the bottle, to form a bundle about as large as the bottle's neck. Place the strips in the bottle, cork lightly, and hang in a window, giving it the greatest amount of light and sunshine possible. In a few days the oil will become clouded; and later a greyish substance will settle, showing a separation of oil and vegetable matter. The supernatant liquid will remain clear and free from odour. For lathe, dental engine and hand-piece, it is a lubricant *par excellence*.—*Office and Laboratory*.

TO UTILIZE OLD GOLD FILLING.

By G. V. N. RELYEA, L.D.S., Oswego, N.Y.

GOLD fillings that have been doing good service for many years often become loose, either from slight decay or accident. We will

suppose such a filling in either the incisors or cuspids, which the patient wants refilled. The party may not be willing or in circumstances to pay for another gold filling, and to fill with any other material may be out of the question. If the gold is in a solid condition, and other circumstances favourable, excavate what may be necessary, then mix a little phosphate very thin, line the cavity with it and place the old gold in its former position, gently press and hold it until the phosphate sets, and if kept dry by the rubber dam it will again do service for many years — *Dominion Dental Journal*.

PRINCIPLE IN PRACTICE.

It is sometimes difficult to carry ethical laws into the professional daily work, and in some of the important relations of the business and political world it seems wholly neglected. The somewhat trite expression that "business is business," meaning thereby that the altruistic idea is always to be subordinated to the selfish advancement of the individual, has, it is feared, become the motive force of large combinations of men to the destruction of the moral law supposed to be necessary for the government of the individual.

The effort has always been, in professions, to eliminate this idea and give a higher tone to the relations between the lawyer and his client, the divine and his congregation, the doctor and his patient. The honorarium of the physician is time-honored, and while it has practically no existence in this country it is still an active force in the Old World, and in some nationalities to send a bill for services rendered is regarded as wholly unprofessional.

While the activities of the world have made inroads in these usages, and modified the ethical code to bring it more in harmony with business ideas, the impress of a higher moral law for the government of professional men still remains to modify the selfish side of human ambition and human greed.

While it is true none of the callings named will work without remuneration, they each, in their special way, labour without a hope of reward to an extent that the outside world knows nothing of, nor, it may be presumed, would it appreciate it. The sentiment of helpfulness to your neighbour will never die out while professions live, however much individuals belonging to them may endeavour to turn the current of thought in other directions.

We are not so much concerned in this article with what may or can be done to help suffering humanity without hope of reward, as we are with the ethical upbuilding of the profession in which we find ourselves workers.

Dentistry began as a trade and the instincts of trade have closely adhered to it, and in the evolution towards a profession it has been found difficult, if not impossible to remove this taint and bring it more into line with the professional spirit. That much has been gained must be acknowledged, but that more is needed must be apparent to every active observer.

The higher development can only come through a more elevated standard of education, both primary and professional, but much may be done to hasten a better conception by personal influence, one upon the other.

One of the most encouraging evidences of a change for the better is manifest in the higher tone of dental journals. Formerly, indeed less than a decade, the conductors of these periodicals were satisfied not to lead but to follow, and this course, unfortunately, led most of them into a lower standard than the profession then occupied. This may be accounted for upon the fact that dental journalism had its origin in trade and was not able to rise above its source. That the publishers of these periodicals have seen the necessity for a change of tactics, and have permitted a large margin of liberty to their editors, is a happy omen of a better state of things, but even here much remains to be desired. The character of some of these is by no means up to the standard of dignity always to be maintained in professional work, whether in the office or at the desk.

It is trite to say, but nevertheless true, that professions are made up of individual elements, and in proportion as these become purified will the entire body advance towards perfection. That we have reached this desirable stage in our progress cannot be said with truth. There is still a tendency to accomplish ends by means not altogether creditable and oftentimes injurious.

Perhaps this is more noticeable in the effort of the few to appropriate the work of others without giving due credit or no credit at all. This tendency to plagiarise was alluded to in a former article, and need only be mentioned here as one of the evils of serious magnitude infesting professional work.

The one great obstacle to progress is the want of moral fibre to withstand the temptations constantly presented in practice. These come in various forms,—the wrong done to patients by not doing the best possible for them ; the shameful neglect so often witnessed in performing the daily operations ; the lack of that necessary care in sterilization, and indifference to the possibility of spreading disease through uncleanness ; the effort to perform unnecessary and expensive operations for the purpose of personal credit, and, above all, in the use of medicaments, compositions of which the operator is ignorant.

This latter offence has become so serious that a determined stand is necessary, or the dental profession will become a by-word and reproach.

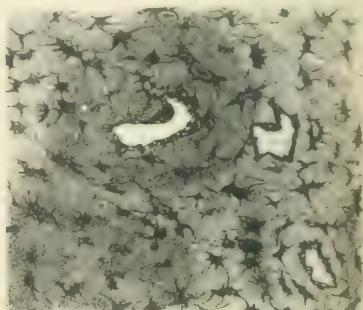
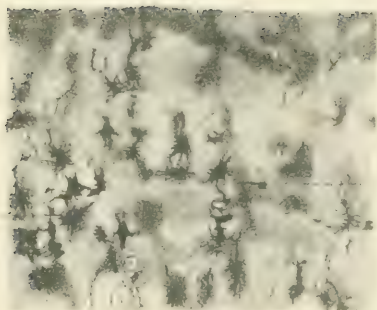
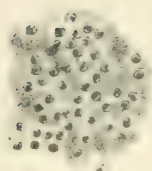
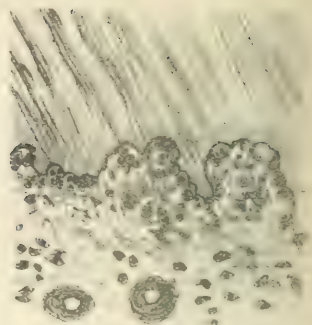
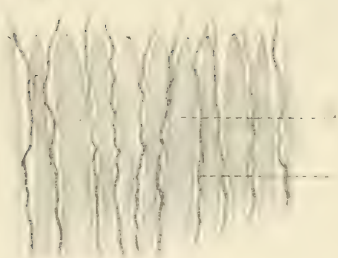
The word " obtundent " has become offensive in the ears of those anxious for better things. Empirical preparations are to-day endangering the health and even the lives of dental patients, but more than this, they are sapping the moral vitality of the profession.

The time has come for a decided position on this question by all the organizations of the world, as the evil is not confined to any one country. The lack of moral strength is to be pitied that leads a dentist to use these unknown compounds, under the weak plea " that my neighbour uses them and, if I am to live, I must."

That ignorance lies at the foundation of this practice must be apparent, ignorance of the possibly dangerous results when injected hypodermically, and ignorance of the pathological laws governing sensibility in tooth-structures.

We have not the space to enter into this branch of the subject, and must be content with asserting, somewhat dogmatically, that the entire obtunding of sensation means a loss of tone and possible destruction of the conductors of sensation. Illustrations of this may be found in the devitalization of pulps, and in necrosis from hypodermic injections.

The moral degradation of the professional spirit is the more serious evil. There is but one course to pursue in this, as well as other matters of an ethical character, and that is, to walk closely to the path which leads to the best interest of those with whom we have to deal, and in thus doing we will be able to keep in the road that leads directly to the higher moral law enunciated nineteen hundred years ago.—*Editorial in International.*



Description of Plate VI.

Fig. 1.—Vertical section of mandible of kitten, with temporary and permanent teeth *in situ*, decalcified in chromic acid: stained carmine and methyl green: two inch objective and A ocular: shews (a) dentine of temporary tooth: (b) flange of gum: (c) pulp of temporary tooth: (d) peridental membrane: (e) dentine of permanent tooth: (f) its pulp: (g) odontoblast layer: (h) ameloblasts torn away: (i) bone of jaw: (j) inferior dental canal: (k) inferior dental artery: (l) nerve: (m) commencement of formation of absorbent organ: (n) dental sac: (o) alveolar periosteum.

Fig. 2.—Longitudinal section of dentine near the pulp cavity, with dentinal fibrils *in situ*: decalcified (Author's process): stained rubine: $\frac{1}{12}$ inch and C ocular: shews (a) dentine matrix: (b) tubule: (c) fibril: (d) fibril passing from pulp into tubule.

Fig. 3.—Transverse section of same: stained gold chloride $\frac{1}{12}$ inch and C ocular: shews (a) tubule with fibril: (b) matrix.

Fig. 4.—Longitudinal section of absorbent organ *in situ*: decalcified: stained carmine: $\frac{1}{6}$ inch and A ocular: shews (a) dentine of temporary tooth: (b) absorbent organ: (c) Howship's lacunæ: (d) multi-nucleated cells: (e) blood vessels.

Fig. 5.—Concentric lamellæ in dentine, longitudinal section of molar (radical portion): ground down: unstained: $\frac{1}{6}$ inch and A ocular: shews (a) dentine matrix: (b) tubule obliquely cut: (c) lamellæ running parallel to pulp cavity.

Fig. 6.—Transverse section of cementum, somewhat hypertrophied: ground down: stained methylene blue: $\frac{1}{8}$ inch and A ocular: shews (a) structureless outer portion: (b) lacunæ: (c) canaliculi: (d) dentinal portion with termination of tubules: (e) lamellæ of cementum.

Fig. 7.—Section of alveolus of jaw, dense cancellous bone: soft parts hardened and section ground down (Caush's method): stained carmine: shews (a) lacunæ containing cells: (b) canaliculi: (c) spaces in cancellous bone.

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DENTAL MICROSCOPY.*

BY

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M.R.C.S.Eng., L.D.S.Eng.

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(Continued from page 442.)

ON STAINING AND MOUNTING SECTIONS.

IN general histology, it is found that unstained sections do not impart so much knowledge to the student as those specimens the structures of which have been differentiated by means of chemical stains or aniline dyes. It is necessary to colour the protoplasm of cells, and the outlines of fibrous tissues, because, otherwise, they would be lost in the general transparency of the section. In dental histology, however, many sections of the hard tissues which have been prepared by grinding, are full of interesting information, even if they have not been subjected to the action of a dye. The histology of dentine and cementum is a case in point. But here, the normal markings are rendered more or less prominent by the accumulation of detritus, water, and air, which get into the interspaces of the tissues by the mere act of grinding down the tooth specimen. Consequently, a preparation showing well-marked degrees of contrast—a study in blacks and greys, it might be termed—results.

*The Advan-
tages of
Staining.*

Yet, in connection with the soft and hard dental

*NOTE.—The drawings throughout this work are made for the most part, from original photographs.

tissues generally, it is all important to employ staining fluids; all sections having first been examined under the microscope, before the choice of stain is determined upon.

The various reagents used in microscopy may be classified as General, and Specific.

Classification of Stains.

The General Stains include all colouring matters that act on the plasma or ground-substance and nuclei of cells and tissues. They may therefore be spoken of as *Nuclear* and *Plasmatic*. No exclusive nuclear stain exists: the colouring of these parts of cells depends on the comparative affinity that some dyes have for them, more than for the plasma in which they are imbedded.

The Specific Stains are those produced chiefly by the action of the salts of certain chemical compounds on certain tissues. Several aniline dyes are also included under this head.

The two most valuable.

Of all the general stains, the two most important are hæmatoxyline, and carmine, and their derivatives: and for all ordinary purposes the former is, beyond doubt, the more useful, either as a nuclear or as a plasmatic stain.

General Methods of Staining, Dehydration, and Clearing.

Washing.

Sections are removed from the preservative alcohol by means of a section lifter, and are dropped into a dish containing distilled water. Curled-up sections flatten out, twisted ones become unfolded, and presently, thorough hydration takes place. A gentle stream of water from a glass pipette is useful for moving the objects about and washing them.

Immersion

(i.) *Staining by Immersion.*—Three watch glasses are placed on the table and half filled with reagents. The first contains the staining solution, the second absolute alcohol, the third oil of cedar wood, or other

clarifying medium. A glass capsule, of large dimensions, filled with distilled water, is also required.

The washed section is placed in the stain, in which it remains for a variable length of time, according to the nature of the specimen and the character and strength of the stain used. When the object is completely coloured, it is lifted out on a section lifter, and excess of colouring matter removed by well washing in distilled water.

It is now ready for dehydration, which is done by *Dehydration.* transferring the section to the watch-glass of alcohol. After about three minutes' immersion, the tissue is made to float on to a clean section lifter, which removes it from the alcohol.

Allow excess of spirit to drop from off the lifter, *Clearing.* and finally place the specimen in cedar wood oil. Leave it here about one to two minutes. This "clears" it, *i.e.*, renders it transparent; the action of the alcohol being to get rid of all water from the tissue, and make it fit for immersion in oil.

The section is finally removed from the clarifying medium, and placed on a glass slide, to be immediately mounted.

(ii.) *Staining by Transfusion.*—This plan is only adopted when certain tissues have been teased out, and are, therefore, not suitable for transference from reagent to reagent. Specimens of enamel prisms, sheaths of Neumann, isolated odontoblasts, &c., may all be stained by placing a small portion of the teased-out mass in the centre of a glass slide, and covering it with a drop or two of normal salt solution or glycerine, and a cover glass. An aqueous solution of borax-carmines, or rubine is applied to the side of the cover glass, by means of a glass rod. The dye immediately runs beneath, and soon stains the tissues, all excess being removed by means of blotting-paper held to the opposite side of the cover glass, and further irrigated with distilled water to which a *For teased-out specimens.*

small quantity of a one per cent. solution of acetic acid has been added. More salt solution is added, and in this or in glycerine, the tissues are mounted, the cover glass being, at once, rung round with cement.

General Stains.

*Hæmatoxy-
lene.*

Of all the general stains, *Hæmatoxylene* is the most useful. There are numerous varieties of this stain—Ehrlich's, Delafield's, Kleinenberg's, Weigert's, &c., all differing in their formulæ. It is advisable, however, to make a point of using one kind for general purposes, and a special variety for special work.

The alcoholic solution of hæmatoxylene has, for its colouring principle, hæmatëin, and it may be used as a nuclear or as a plasmatic stain.

As a Nuclear Stain.—Place in a glass capsule 6 c.c. of distilled water, and add three or four drops of a strong, "ripened" alcoholic solution. Stir the mixture well. Place in the fluid three or four sections of soft or decalcified specimens. Leave them for a quarter or half-an-hour. Remove and wash thoroughly, first with distilled water, then ordinary (slightly alkaline) tap water. The stain is thus rendered free from precipitate,* and the nuclei are tinged a clear dark blue.

*Contrast
Staining.*

Counter staining may be accomplished by dehydrating sections stained as above in absolute alcohol, to which an alcoholic solution of eosine has been added in sufficient quantity to deeply colour the absolute alcohol. The sections remain in the alcohol for two minutes, and are then passed through cedar wood oil, and mounted in Canada balsam. Thus, most beautiful results are obtained. All kinds of

* A heavy blue precipitate seems to form in most hæmatoxylenes, apparently due to conversion of alum into free sulphuric acid, and a basic compound of alumina. See Bolles Lee's Manual "Microtometist's Vade Mecum," 1893.

developmental specimens make good objects for thus doubly staining in blue and red.

As a Plasmatic Stain.—Proceed as just described, but leave sections in the hæmatoxyline from 18 to 24 hours. Do not counter-stain. Overstaining may be discharged by immersing sections in 70 per cent. alcohol to which one-tenth per cent. pure hydrochloric acid has been added. Neutralize in a solution of bicarbonate of soda, 1 gr. to 2 oz., to prevent subsequent fading of the stain.

Borax-Carmine is useful for staining in bulk, and *Carmine*. as a nuclear or plasmatic stain.

Staining in Bulk.—For early embryonic jaws which are to be stained *en masse* and imbedded in celloidin, Grenacher's alcoholic solution of borax carmine is valuable.

Place the tissue in the stain for one to four days; remove to 70 per cent alcohol plus one-half per cent. of pure hydrochloric acid for one day; transfer to 90 per cent. alcohol for 24 hours, and finally keep in absolute alcohol before imbedding.

As a Nuclear and Plasmatic Stain.—Immerse sections in borax or lithium carmine for half-an-hour to two hours. The stain may be removed from the ground substance of cells by placing in acidulated alcohol for ten minutes. Plasmatic stains are "fixed," by washing in one per cent. acetic acid in water for five minutes, and then washing in distilled water. Sections are afterwards dehydrated, cleared, and mounted in the usual way.

As a Contrast Stain to carmine, alcoholic picric acid may be used. Treat the sections as just described, but do not place them in acidulated alcohol. After rinsing the sections for two minutes in 70 per cent. spirit, place them in picric acid for five minutes; then dehydrate, clear, and mount. This combination is useful for pulp and the peridental membrane, the cells being stained pink and fibrous tissues yellow.

*Contrast
Staining.*

*Additional
combinations.*

Extremely beautiful effects may be obtained by staining vertical sections of foetal jaws with teeth *in situ*—similar to those figured in Plates III. and VI.—with borax-carmin in the usual way, and counter-staining by immersing for a few minutes in an alcoholic solution of sulph-indigotate of soda. If this is done, the fibrous, connective, and other soft tissues are coloured violet, while bone and dentine are pink, and enamel (when present) a darker shade of pink. Another variation producing equally striking results occurs if eosine and methyl green are used in place of the carmine and indigo stains.

Other carmine stains comprise those known as lithum, and ammonia carmines, and Beale's, Merkel's, Orth's, and Grenacher's solutions. Advanced students are referred to general text books.

Other general stains are rubine, eosine, fuchsine, methylene blue, gentian violet, safranin. &c. These may be used as the fancy of the student dictates: for sections of decalcified teeth with pulp *in situ*, the three first-named will be found of great value.*

Specific Stains.

*For what
useful.*

These possess an affinity for certain elements in the tissues, and are used for demonstrating the outlines of cells, nerve filaments, &c., either singly or combined with plasmatic stains.

In this group there may be mentioned as suitable for dental microscopy, chloride of gold, osmic acid, chromic acid, iron, and nitrate of silver.

*Chloride of
Gold*

Chloride of Gold.—This is an important reagent for differentiating the course of nerves fibres, and marking out the soft tissues in connection with dentine and cementum.

It is not necessary for the tissues to be absolutely fresh: those that have been previously hardened,

* Accidental staining of the fingers with aniline dyes may be removed by an application of soap and pumice.

and have passed through various stages of decalcification may be stained equally as well as any calcified section.

There are several methods in vogue, but the most convenient is that introduced by Mr. Underwood. He proceeds as follows :—

“ *a.* Wash the sections in a solution of bicarbonate of soda. (5 grains to the ounce.) *Underwood's Method.*

b. Put some 1 per cent. solution of chloride of gold in a watch-glass, test it with litmus paper, and, if it be acid, add bicarbonate of soda by drops till it is neutral; place the sections in the solution, and cover the watch glass with a lid to keep it in the dark—a lid of a china pot such as is used for potted meat serves very well—for from half-an hour to an hour, until the sections look straw coloured.

c. Remove sections from staining fluid to distilled water, and leave them covered over—they must not be exposed to light for more than a few seconds—for a few minutes.

d. Put some 1 per cent. formic acid in a watch glass, float the glass in hot water, put the sections in the acid, cover them over, and keep them in the dark, and fairly hot, until they turn crimson. This generally takes about an hour, but the operator must be guided by the tint of the sections, which he must look at from time to time. A simple way to do this is to fill an old china anchovy-paste pot with hot water, place it on a stove, float the watch-glass containing the acid and the sections in it, and cover it up with its own lid.

e. When stained, immerse the sections in cold distilled water for about half-an-hour.

f. Dry the sections and mount them in glycerine jelly. Avoid Canada balsam.”

During the manipulations with this and the following stains, it is advisable to use bone or wooden section lifters and other non-metallic instruments.

It is not necessary to keep the bottle containing the gold solution in the dark.

Osmic Acid. *Osmic Acid* is valuable as a (i.) Specific or (ii.) Pigmentation stain: for the former, it is useful for colouring the myelin sheaths of medullated nerves; for the latter, the interglobular spaces in dentine.

(i.) Place a fresh isolated pulp in a one per cent. solution of this acid for 24 hours in the dark. Wash with distilled water, imbed in gum, cut sections, counter-stain with eosine if desired, dehydrate, clear, and mount.

(ii.) Ground-down sections of dentine are first stained, for a few minutes, in the ordinary solution of hæmatoxyline, and then partially decolourised by means of very dilute acetic acid, in such a manner that the interglobular spaces only retain the colour. Wash the sections in distilled water, and then place them in a one per cent. solution of osmic acid for one hour. Finally, wash, clear, and mount. Thus pigmentation of the interglobular spaces occurs, due as Black has shown, to their being filled with a fine black amorphous deposit, which consequently renders them remarkably conspicuous.

Chromic Acid *Chromic Acid* can be used as a $\frac{1}{2}$ per cent solution for staining the peripheral nerves in a fresh pulp (Boll).*

Iron. *Iron and Tannin Stain.*—Place the section, after washing in distilled water, in a capsule containing liquor ferri perchloridi (B.P.) for twenty-four hours. Wash quickly in distilled water, and pass into a solution of tannic acid, 2 grains, and distilled water 6 c.c. for five or ten minutes. Remove and again wash in water.

Mr. Howard Mummery, in whose hands this iron stain has been very successful, has succeeded in

* Tomes' "Manual of Dental Anatomy," p. 45. 1894.

tracing numerous fine fibres from the nerve bundles in the pulp.

Nitrate of Silver is said to be of service for *Silver*, bringing out the epithelial nature of Nasmyth's membrane by staining black the intercellular cement substance of the tissue. A half per cent. solution in distilled water must be used, the membrane remaining in the stain for half-an-hour in the dark. After washing, it must be mounted in glycerine or Farrant's medium, and kept in the dark. This is the least useful of the specific stains.

Contrast Stains.

In addition to those already mentioned, the following make good counter stains:— *Other Contrast Stains.*

Hæmatoxylene (Ehrlich's) and orange rubine.

Gentian violet and benzo-purpurine.

The Ehrlich-Biondi mixture—orange, fuchsine, and methyl green.

Borax-carmines (Merkel's) and borax-indigo-carmines.

For the last-named, use oxalic acid (a saturated aqueous solution) for washing sections. It fixes the indigo-carmines.

The above may be applied to specimens of developing tissues, pulp, and peridental membrane and dentine.

For double staining soft tissues *en masse*, combine alum-carmines with osmic acid.

Special Stains.

When it is necessary to investigate certain tissues during original research, it is most desirable to employ more than one method of staining. There are several special stains that are suited for dental work, and they must not be omitted here. A brief description of these special methods will be found useful. *Need for Special Stains*

Golgi's Stain. *Golgi's Stain.*—There are three variations. The following is, however, convenient:—

Place fresh sections of dentine in bichromate of potash (2 per cent. sol.) 8 parts, osmic acid (1 per cent. sol.) 2 parts, for 24 to 36 hours.

Remove to a .5 per cent. solution of silver nitrate for one day. The tissues should be kept in the dark during the latter part of the process. Dehydrate, clear, and mount. Cover-glasses may be used.

Marchi's Stain.

Marchi's Method for staining degenerate nerve fibres. Applicable to sections of dental pulp. Pulp are hardened for a week in Müller's fluid, and then for another week in a solution composed of Müller's fluid two parts, osmic acid (1 per cent. sol.) one part. Large quantities of the solution should be used, and the tissues be very thin.

Weigert's Stain.

Weigert's Stain.—To blacken the medullated sheaths of nerves. Useful when pulps are prepared and cut *in situ*, having been previously hardened in bichromate of potash.

Sections are immersed in a (i.) saturated aqueous solution of acetate of copper with equal parts of water, kept at a temperature of 40° C. or 104° F. for two days. They are then washed in 90 per cent. alcohol and placed in (ii.) a fresh solution made after this formula:—

Hæmatoxylene ... 1 part ...or 1 grm.

Alcohol.....10 parts...or 10 c.c.

Distilled Water ...90 parts...or 90 c.c.

Saturated Sol. of Lithium Carb. 1 part or 1 c.c.

Leave in the solution for 24 hours. They are again washed in distilled water for many hours, and finally decolourised in two hours by placing in (iii) a solution of

Borax..... 2 parts or 2 grms.

Potassium Ferricyanide 2½ parts or 2.5 grms.

Water 200 parts or 200 c.c.

Subsequently they are washed, dehydrated and mounted in the usual manner.

Charters White's Stain.—This method has for its object the differentiation of internal cavities and spaces in bone and teeth. It produces very beautiful specimens of the calcified tissues. Cut teeth into sections, having the thinness of about $\frac{1}{25}$ of an inch. Soak them in absolute alcohol for a short time, then place them in ether sulph. meth. Make a stained celloidin solution by adding fuchsine to alcohol "until a dark port wine colour is produced," mixing this with ether and adding celloidin till the required consistency is reached. Saturate the sections with this mixture for several days. Remove them and let them dry by evaporation. Finish by grinding on a wheel, and rubbing between plates of glass; and mount at once in balsam.

*Charters
White's
Stain.*

DEHYDRATING TISSUES.

An immersion of two minutes' duration in absolute alcohol will thoroughly rid ordinary sections of all water, after they have been stained, and before "clearing." Very delicate tissues, however, shrink too much if placed at once in absolute alcohol. Therefore it is necessary, when dealing with these cases, to pass sections quickly through 50 per cent., 70 per cent., and 90 per cent. spirit, before finally immersing in absolute alcohol.

*Special
Dehydration.*

CLEARING SECTIONS.

Several essential oils are used for this purpose, including the oils of cedar wood, cloves, bergamot, origanum, and also xylol or turpentine. Their functions are twofold—first, to render stained sections transparent, and second, to prepare them for the balsamic mounting media.

Clearing

The object is removed from absolute alcohol, and floated on to the surface of the oil in a watch-glass. It should remain in the oil for 1-2 minutes.

A newer and better plan is to put the clearing medium into a test tube, and carefully pour on its surface a quantity of absolute alcohol. Place the sections in the alcohol; they will shortly have sunk to the bottom of the test tube through the alcohol, which may then be drawn off by means of a glass pipette. Sections are then ready for mounting.

*Another
Method.*

Oil of cloves must not be used for clearing celloidin-imbedded sections. It removes aniline dyes and causes a certain amount of shrinkage. Oil of bergamot clears celloidin, and does not dissolve it.

Table of Tissues suitable for Staining with

1. Hæmatoxyline and its varieties	All embryonic and foetal soft tissues, pulp, peridental membrane, gum, &c.
2. Carmine and its varieties	The same; and also enamel prisms, dentinal fibrils in young dentine, interglobular spaces. Fish's teeth.
3. Fuchsine	Ramifications of dentinal tubules, cemental canaliculi, and the spaces in osseous tissue, &c.
4. Rubine, methylene blue, eosine	Dental pulp; and peridental membrane, striæ of Retzius, dentine, dental gum.
5. Double stains as Ehrlich-Biondi fluid	Developmental tissues.
6. Gold chloride ... (Underwood's plan)	Interglobular spaces, odontoblasts <i>in situ</i> , nerves of pulp, dentinal fibrils, interprismatic enamel substance (Bödecker).
7. Osmic acid ...	Medullated nerves of pulp, interglobular spaces.
8. Chromic acid ...	The same.
9. Iron and tannin ...	Dentinal fibrils, nerves of pulp.
10. Nitrate of silver...	Nasmyth's membrane; and as Golgi's stain — sheaths of Neumann <i>in situ</i> , interglobular spaces, layer of semi-calcified dentine.

MOUNTING SECTIONS.

The final stages of practical microscopy are concerned with the operations of permanently mounting sections, and "finishing" slides by cementing their cover glasses in such a manner that evaporation of the mountant cannot take place.

There are two chief methods by which sections may be mounted, *viz.*, (A) Transference with a section lifter, and (B) Flotation. The former is the one most generally employed, being applicable to the majority of specimens which are to be preserved in Canada balsam, or other media. Mounting by flotation is used when the sections are too thin or small or friable to be moved from reagent to reagent, as in the first method; and when they are to be mounted in aqueous media.

A

Mounting by Transference.

Sections having been stained, washed, dehydrated, and cleared, as already indicated, are removed from the watch glass of cedar oil, by passing a clean section lifter underneath them. Holding the blade horizontally with a considerable amount of oil and the section upon it, the student carries the section to a clean slide laid flat on the surface of a sheet of white paper lying on the table, and slightly tilts the lifter allowing the section, enveloped in oil, to run on to the slide, and guiding it with a needle-point towards the centre. Excess of oil is removed by tilting the slide and carefully absorbing what remains, by means of a piece of clean, thin blotting or filter paper. A drop of benzole balsam from the end of a glass rod, is next placed on the top of the section, and a cover glass, which must be thoroughly clean and dry, having received a drop of the same medium on its reverse side (that is, the side which will shortly touch the slide) is gently lowered on to the section in the following way:—

*Use of a
Section Lifter*

*Mounting in
Balsam.*

Method of applying the Cover Glass.—Hold the cover glass by its periphery, between the left forefinger and thumb in a tilted position; pass beneath it a needle, gradually bring the needle closer and closer

*To avoid
air bubbles.*

to the slide till the drops of medium have met. (See fig. 10). Then slowly remove the needle and the

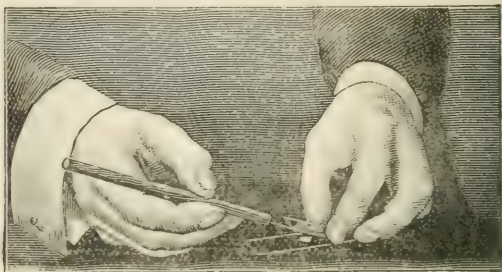


Fig. 10.

mountant will gradually fill the whole of the under surface of the cover glass, at the same time that it excludes a ring of air from its centre. This method of placing the cover glass in position is applicable to both aqueous and balsamic mounting media, and with a little practice, it is thus possible to prevent any air bubbles from being retained between the glasses.

*Removal of
air bubbles.*

Should they, however, be present, the balsam should be slowly warmed over a spirit flame, and a mounting clip passed over the centres of both cover glass and slide. The clip should remain in place for a few days.

If it is found after a section has been mounted, that an insufficient quantity of balsam has been used, and that air *spaces* exist beneath the cover glass, it is best not to warm the slide, but to apply a drop or two of thin balsam to the slide, near that edge of the cover glass where the space is seen. The balsam by capillary attraction runs beneath the cover glass, and efficiently fills the vacuum. In a week or two the mountant will be dry and the slide can then be "rung."

*Final treat-
ment.*

Any superfluous balsam that may have been pressed from beneath the cover glass during or after mounting, should not be removed until quite dry. If a penknife is used for scraping it away, and the

edge of the cover glass finally wiped with a clean rag, moistened with xylol, the slide will present a neat appearance.

Other Methods of Mounting in Balsam.

(1.) *For Calcified Tissues.*—Dried, ground-down sections of teeth can be mounted in Canada balsam without previous dehydration or clearing, the object here being the retention of air and water in the dentinal tubules and other spaces. The highly refractive balsam should not be thin enough to allow of its penetration into these spaces, or the structure of the hard tissues will become obliterated. For attaining this end, the plan of Mr. Charters White* is to be recommended.

The tooth having been ground while fastened on to the slide with Canada balsam, is unloosed from its position by long immersion in absolute alcohol, which may be wiped off with a camel's hair brush. When quite clean, the section should be placed for a long period in distilled water till complete hydration occurs. The surfaces of the section should be then quickly dried on a clean thin cloth, and the specimen mounted in stiff balsam. The water and air in the dentinal tubules will thus prevent the balsam entering them.

*Charters
White's
Method.*

Mr. J. E. Ady† adopts for the same purpose the following mode of procedure:—

Ady's Method

Finished sections are dipped for a moment in an alcoholic solution of white shellac, "and withdrawn when a thin coating of the lac is left over its surface, occluding the spaces." They are then mounted in usual way.

**Op. cit.* pp. 41 & 42.

†*Idem.* p. 42.

*Mansbridge's
Method.*

A plan has been devised by Mr. *Mansbridge** for giving the same results. He says:—

“Take a clean slide, place it upon a hot table with a small single lump of (desiccated) balsam upon it: use sufficient heat to slowly melt the balsam, which must not be made too hot. When sufficiently fluid, lay the section upon it, and cover with a hot cover glass, which must be pressed down in such a way as to expel the air from beneath it. Remove the slide to a cool surface and continue to keep pressure upon the cover glass for a few minutes, when the balsam will be found to be quite hard.”

(2.) *For Decalcified Tissues.*—Air may be well retained in interglobular spaces, tubules, &c., by treating sections of teeth with the method that Prof. Flemming† recommends for decalcified bone.

*Flemming's
Method.*

They should be washed with alcohol and ether and laid flat on glass, and then covered with a double layer of blotting paper under a heavy piece of glass. They can then be dried in the air, or better and more quickly in an oven. A glass slide having been prepared by putting a drop of warmed stiff balsam in the centre, and allowing it to spread out flat, receives the dried section. It is then covered with a similarly prepared cover glass, a clip is applied, and the slide and section warmed over a spirit flame.

To remove the thick, hard, and perhaps dirty Canada balsam that sometimes occludes the clear interspaces of sections prepared by Weil's process.

*Spokes'
Method.*

Mr. Sydney Spokes suggests the following:—

If the section has been sufficiently ground, it is well washed with water and scrubbed with a camel's hair pencil. Next, it is placed in the centre of a glass slide covered from dust, and allowed to dry.

* Transactions Odontological Society. Vol. xxv., p. 176.

† Zeit. f. Wiss. Mik. 1889. p. 47.

When about to mount the section, the student should have ready at hand a clean cover glass with a drop of warm balsam in the centre. Then upon this section—which has not been moved from its position on the slide—must be dropped a succession of drops of chloroform, one drop at a time in such a manner that at no time does the chloroform become completely evaporated, or the section curled by drying. The solvent action of the chloroform will cause small *debris* to be thus finally floated to the circumference of the section without the parts being disturbed in their mutual relationship. Before the last drop of chloroform has evaporated the cover-glass should be inverted and lowered gradually on to the specimen, in the way already described.

B

Mounting by Flotation.

The section, stained or otherwise, having been finally washed, is placed in a large dish of clean water, where it is flattened out, if necessary, by gently removing the creases or folds with a camel's hair brush.

A thoroughly clean slide is held between the forefinger and thumb of the left hand at an angle of about 60°. and dipped for half its length in the water. The section is guided into the centre of the slide by means of careful manipulation with a mounted needle held in the left hand. If one end of the slide is tilted up a little further, and the needle point fixes the section in position, the slide may be entirely withdrawn from the water, with the section lying flat upon its surface. Excess of water must be removed by the application of a piece of blotting paper to the side of the section as the slide lies on the table top. A drop of an aqueous mountant having been put

*Modus
operandi.*

on the section, a cover glass is applied, and the mounting completed.

Ordinary sections that are to be mounted in aqueous media are not necessarily always treated with the flotation process. In many cases the section is lifted out of the washing water and simply placed on the slide by means of a section lifter.

Aqueous Mountants.

The Aqueous Mountants include, among others, glycerine jelly, Farrant's medium, normal salt solution, and soluble glass. Sections which are to be mounted in any of these fluids do not require dehydrating or clarifying, the media themselves performing these functions at the time of using. The two first named are the most useful.

Glycerine Jelly is of service for mounting sections stained with chloride of gold, and for teased-out specimens, such as sheaths of Neumann, &c. It consists of French gelatine, glycerine, and distilled water, in the proportion of one, four, and six parts respectively. The slide, mountant, and cover glass should be slightly warmed, and the slide "rung" with cement as soon afterwards as practicable.

Similar in properties, but dissimilar in composition, is *Farrant's Medium*, which consists of glycerine, powdered gum arabic, and a saturated solution of arsenious acid.

Normal Salt Solution is a valuable mountant after specimens have been stained by transfusion. It should be allowed to run under the cover glass after excess of the stain has been washed away.

Soluble Glass has been found to be a fairly successful mountant by the writer. It does not possess any very special qualifications, and the foregoing media are certainly more reliable.

It is a mistake to mount more than one section on each slide, unless they are *extremely* thin.

Special Methods of Mounting.

For sections which have been cut in paraffin, and are to be arranged in series, special slides and cover glasses must be purchased. The former should measure 6 by 1 or 2 inches, and the latter 5 by $\frac{3}{4}$ -inch or 1½ inches. The sections are placed on a dry slide, one after the other, or in a ribbon, and the slide tilted to allow excess of water to drain away, ten minutes being necessary for this. When nearly dry, drop some creosote-shellac on the section and place the slide over a water bath for 24 hours. Dissolve the paraffin off with xylol, and the sections will be adherent to the glass. Clear them with oil of cedar, and mount in Canada balsam. Another way is to put a drop of water and spirit on each section, and evaporate carefully over a spirit lamp. Then use xylol, &c.

*Special slides
for ribbon
sections.*

Unmounting Sections.

It is sometimes necessary to remove a mounted section from the slide, and re-stain, and re-mount it. This applies chiefly to sections which, having been kept some length of time, have faded, and to those for which a wrong stain has been used. Tissues dyed with hæmatocxyline, no matter how carefully it has been done, lose, in the course of years, a great deal of their beauty and their brilliancy.

*Need for
unmounting.*

If care is exercised, these old sections can be renovated with much success.

The process will vary with the nature of the mountant.

(i.) *Those Mounted in Canada Balsam.*—First remove the cementing ring around the cover glass, by soaking the whole slide in a small quantity of ether. A sharp fine knife point will then scratch off the rest of the dissolved cement. The centre of the slide should next be held over a spirit flame, or placed on

a hot brass table. Heat must be applied gradually and at once stopped on any signs of bubbling of the balsam becoming noticed. Before the slide and cover glass have become cold again, gently push the latter towards the side of the slide, and carefully lift it up with a pair of fine tweezers. Dissolve off the rest of the balsam by immersing the slide with the section still adherent, in a bath of chloroform or xylol for five or ten minutes. The specimen is then removed from the slide by means of a small stiff brush, and placed on a clean glass slip and examined quickly microscopically, to ascertain if it has suffered by removal. If not, float it off on to distilled water where it should be well washed for an hour. Then re-stain and mount in the ordinary manner.

(ii.) *Those Mounted in Aqueous Media.*—Place the whole slide in a tray of hot water for about one minute. The heat will dissolve the mountant, and at the same time loosen the cover glass, which should not be lifted up, but gently pushed along the surface of the slide.

Finishing Slides.

It is often quite unnecessary to “ring” balsam preparations, though a black cement neatly applied, always gives a slide a finished appearance. It is imperative, however, to cement cover glasses having beneath them glycerine jelly, or Farrant's solution.

*Use of a turn-
table.*

Fix the slide on a turntable, by means of the clips, in such a position that the centres of cover glass and the brass table correspond. Revolve the disc with the left forefinger, and apply the medium with a long thin camel's hair brush, a Rigger, No. 1, being best for this purpose. The brush can afterwards be washed with turpentine or soap and hot water.

There are many cements made and sold for "ringing" slides—Aspinall's black enamel gives very satisfactory results,—black being preferred, because white or coloured cements soon begin to look dirty, and a fresh "ring" has to be applied.

Finally, a neat white label is affixed to one end of the slide, and the character of the specimen, the name of the stain, and mountant, and date noted thereon, the slide being subsequently placed in the cabinet.

The student is advised to purchase his staining solutions, mountants, and cements ready made. They can be obtained of Messrs. Becker and Co., of Hatton Wall, Kanthack, of Golden Square, and all opticians and dealers in microscopical materials.

(To be continued.)

BIOLOGY OF BACTERIA AS EXEMPLIFIED IN THE MOUTH.*

By NORMAN G. BENNETT, B.A. (Cantab.).

INTRODUCTION.—Before proceeding to the consideration of my subject, I should like to offer some words in justification of my choice. It is true that the profession of Dental Surgery is essentially a practical one; its knowledge is a science, but its practice is largely an art.

On that account the great majority of the papers read before this Society should, and, perhaps, do refer to subjects of a practical nature. Nevertheless, it is an axiom of all medical treatment (I use the word in its widest sense), that improvement in method advances step by step with increased knowledge of pathology. This applies to dentistry as to other branches of surgery.

I need scarcely, I think, plead any excuse for choosing bacteria for discussion as being an important factor in various branches of dental pathology.

*A Paper read before the Students' Society of the Dental Hospital of London.

The point I wish chiefly to insist on is that it is not sufficient to study these organisms solely in their relation to dental or oral matters, but that it is necessary to take a broader interest in their functions, and so arrive at a more perfect knowledge of the organisms and the effects they produce.

I take it that the object of a society such as ours is the two-fold one of instruction and entertainment, and that one is justified in deviating occasionally from the more immediate paths in which dental matters lie, if an interesting subject presents itself which has a bearing, direct or indirect, upon the pathology or practice of the profession.

I only trust that you will not judge of the interest of the subject by my handling of it, but put down any defects in that respect to my having failed to present its facts in an attractive fashion.

DENTAL CARIES.

The phenomena of dental caries first claim our attention, as being familiar, widespread, and important, and as illustrating well the actions of bacteria in general.

A tooth consists partly of inorganic material, chiefly the phosphate and carbonate of calcium and magnesium, to which it owes its hardness, and partly of organic proteid substances. The enamel consists almost entirely of the former, but the dentine contains a considerable proportion of the latter.

The process of decay consists in a disintegration of both these materials. In the case of the enamel, we have merely to do with the solution of a salt by an acid (an ordinary chemical process); but in the decay of the dentine, we have in addition the so-called peptonizing action, by which the proteid material is liquefied and disintegrated. Both these effects are in the main the result of the presence within the mouth of bacteria.

A historic interest attaches to them. Among the earliest attempts to describe the organisms we are considering, whether within the mouth or without, was that of Leeuwenhock, a Dutchman, so long ago as the latter end of the seventeenth century, who took for his material the white deposit found round the necks of teeth, and examined it with the aid of one of the first microscopes ever made, as we now understand that term.

A rough classification of the forms of these monocellular organisms divides them into micrococci or spherical forms, bacilli or rods, and comma-shaped bodies.

The usual method of reproduction is by simple transverse fission. The daughter cells so produced frequently remain adherent; hence the various groups of micrococci arranged in pairs, called diplococci, fours, eights, or larger packets contained or not as the case may be, in a capsule of gelatinous jelly and called zooglœa forms.

In the same way we may get threads of micrococci called streptococci, or threads of bacilli called leptothrix. The comma forms end to end, will produce curved threads called spirilla or spirochaetia. Whatever the form of the group, each individual cell consists of an envelope and its protoplasmic contents.

The other method of reproduction is known as spore formation, by which a single cell, or its contents, becomes transformed into an ovoid, highly refractile body. These spores are of great interest, because it is in this condition that they are most tenacious of life and resistant to noxious external conditions. They are usually formed when the conditions of nutrition are bad owing to a failure of supply.

Of such forms as have been described, more than a hundred may be found in the mouth at different times and under different conditions, but there are about six very constant forms which occur in almost every mouth.

(a) *Leptothrix innominata* is found in the white deposit previously mentioned, and consists of fine threads, immotile and curved or twisted in zigzag lines.

(b) *Bacillus buccalis maximus* consists of large rods, either single or in jointed threads, and staining blue with iodine.

(c) *Leptothrix buccalis maxima* is very similar, but consists of shorter joints, which do not stain with iodine.

(d) *Iodococcus vaginatus* is a micrococcus, occurring singly or in chains, the chains being contained in an envelope, which does not stain blue with iodine, while the cell-contents do.

(e and f) *Spirillum sputigenum* and *spirochaete dentium* occur as commas or spirals and are motile.

None of these are capable of artificial cultivation, but several of the less common varieties are. The point of interest from the

aspect of dental caries is that certain individuals are capable of producing lactic acid. Hueppe has described two as occurring in the mouth, either very short rods or micrococci. And it is this lactic acid, concerning the production of which we shall deal further presently, aided doubtless by small quantities of other acids, which is instrumental in bringing about the solution of the inorganic constituents of the teeth. This operation naturally takes place most easily between the teeth where the movement of fluid is least.

When we come to consider the dentinal decay, we find we have another matter to deal with, the disposal of the putrid substance.

A microscopic examination of a section of decaying dentine will yield these appearances.

At the outside (the most decayed part) will be found a mass of micro organisms of various kinds, together with *debris* of tooth material. Here a large quantity of thread forms will probably be observed, but, as we approach the sounder tissue, we shall find that the dentine retains its tubular appearance, but that the tubes are filled with organisms consisting chiefly of bacilli and micrococci. The tubules will appear enlarged and in some cases confluent, the interesting substance having been liquefied. These are the liquefaction foci.

Proceeding a little farther in, we find perhaps a single file, appearing to consist of one kind only, whether spherical or rod-shaped; or short of this there may be a mixed infection in a single tubule. This appearance would suggest that a single row of organisms resembling one another is probably due to invasion of a tubule by a single organism which has afterwards divided and formed a row, at the same time blocking out other forms.

Many of these have been cultivated. They are in no sense specific but comprise any variety which may be capable of producing lactic acid or of exercising the peptonizing action of which we shall speak presently.

We have so far viewed the phenomena of dental caries chiefly from the point of view of the tooth. We have seen how it is attacked, first by the lactic acid produced by many different kinds, and subsequently by the combined forces of lactic acid and the peptonizing action of such organisms as are capable of exercising it, of which doubtless there are several.

But to get a true idea of those processes, it is necessary to consider them from the point of view of the organisms themselves.

Bacteria then, are the lowest forms of vegetable life. They belong to that section of vegetable nature named fungi in so far as they are devoid of the green colouring matter known as chlorophyll which is possessed by all the higher plants, and of which so large a quantity is exposed to the light in their leaves.

Animals are dependent upon plants for their existence. They are incapable of assimilating the simple inorganic salts upon which plants thrive, but must have the elements of which proteid mainly consists, carbon, nitrogen, hydrogen and oxygen, already worked up into complex organic material. This is done by plants, which obtain their nitrogen from the soil chiefly in the form of nitrates and their carbon from the CO_2 found in the atmosphere and constantly being formed by the oxidation or respiration of all living creatures whether animal or vegetable.

But it is only green plants containing chlorophyll which have his power of carbon-fixing by the aid of light. The great majority of bacteria resemble the higher fungi in being devoid of chlorophyll and are therefore dependent, in the same way as animals, upon green plants for their carbon compounds.

Hence their parasitic life. Whether their host be live or dead is not of much importance except from a botanical aspect; those however which live upon dead matter are usually called saprophytes.

This mode of life is exemplified in the artificial media upon which bacteria are grown. It is not sufficient that a culture medium should contain ammonium salts or nitrates, it must also have present some carbon compound, such as beef broth or sugar; these food stuffs being suspended in gelatine or agar-agar. This culture medium is inoculated by stabs, pricks, or upon its surface.

Of most importance is the effect produced by the organisms upon the substratum whereon they live. It would be contrary to all expectation were not some destructive changes produced, but as a rule the change is out of all proportion to the needs of the organism.

A familiar instance of such change is that of ordinary putrefaction, by which dead organic matter is split up into extremely simple compounds, chiefly CO_2 and water together with odorous gases such as H_2S .

Of those varieties generally known as fermentations the one which has been most studied is that of the derivation of alcohol from sugar with evolution of CO_2 by means of the yeast fungus.

The one with which we are concerned chiefly but which must be considered in conjunction with others is the lactic acid fermentation. Several varieties, chiefly cocci, have been described as producing this change. Miller and Hueppe have described varieties found in the mouth.

The change itself is one of the simplest. A single molecule of glucose is split into two molecules of lactic acid, thus:— $\text{C}_6\text{H}_{12}\text{O}_6 = 2 \text{C}_3\text{H}_6\text{O}_3$. This is what largely happens, but besides this there is usually a certain amount of carbonic oxide formed owing to more complete changes, together with small quantities of other organic acids, formic succinic or butyric.

The material for this change in the mouth is of course abundant whether in the form of sugar or starch. Starch must of course be first converted into sugar by the ptyalin of the saliva, and it is found that this newly formed sugar is more easily fermented into lactic acid than sugar introduced as such. In addition to which it more readily adheres to the teeth and is probably the chief source of lactic acid in the mouth. Different sugars vary in their susceptibility to this change. Glucoses, milk sugar, mannite, and muscle sugar readily undergo it, but the saccharoses do not. It is important to notice that the fermentation ceases to act in the presence of excess of its own products. Other examples of such fermentations are the acetic by which alcohol is converted into vinegar, the butyric or the nitrification of the soil, none of which, however, occurs to any perceptible extent within the mouth.

The point to be observed is that all these changes tend towards the oxidation, or hydration, or the splitting up of the food material from which the organisms derive their nourishment.

Similar is the peptonizing of the basis-substance of the dentine produced by the bacilli and micrococci which penetrate the tubules. Here again the solid proteids are reduced to the liquid state on account of the changes incidental to their forming food for bacteria. We find a parallel in the ordinary gastric or pancreatic digestion of mammals during which proteids such as fibrin or globulin are converted into albumose and peptone by the pepsin or trypsin derived from the animal cell; and indeed the changes produced by

bacteria may be the result either of the direct action of the protoplasm or of an intermediate enzyme or ferment produced by the protoplasm from its substance.

It is well known that the decomposition of proteid material may be accompanied by the production of poisonous alkaloids called ptomaines such as cadaverin, muscarin from muscles and others ; although we are not here so much concerned with pathogenic bacteria, it should be mentioned that the peculiar toxic property possessed by the products of these bacteria has been ascribed to such ptomaines or to the presence of albumoses or enzymes formed from, or by the agency of, specific pathogenic bacteria. These poisonous bodies are called toxins.

So far we have considered chiefly dental caries as best exhibiting the results of the presence not of specific, but of ordinary non-pathogenic bacteria in the oral cavity, namely the production of lactic acid and its effects on enamel and dentine and the disintegration of dentine by the same action combined with a peptonizing process.

It will be advisable now to turn our attention briefly to some of the other effects of their presence, and take a glance at the conditions of existence which render the mouth so effective a breeding ground, finishing with a few words on treatment and antiseptics.

TARTAR.

The deposit of tartar found in such large quantities in some mouths has been charged to the long account of bacteria. This idea is due to the late Mr. Robinson of Downing College, Cambridge, and Dr. Geo. Cunningham, who formed cultures of bacteria containing crystals of triple phosphate of ammonium and magnesium ; and reasoning by analogy supposed that tartar was deposited by this action combined with the calcium salts normally contained in the saliva.

PYORRHOEA ALVEOLARIS.

Pyorrhœa alveolaris has been variously described as a disease of the gums, as a catarrh, as caries of the alveoli, or as an inflammation or absorption set up by the presence of tartar, which in small quantities a short distance from the alveolar border, is a very constant phenomenon in association with Rigg's disease. It has been also ascribed to bacteria. Some have considered it a local

disease, among whom was Rigg the first describer. Others have considered it a general disease, notably, Newland Pedley, and Bland Sutton. It has been variously associated with innumerable evil conditions from tuberculosis to want of exercise and bad lodging.

It is urged by the opponents of the theory that the line of tartar is the origin of the evil, that the space which exists between this deposit and the margin of alveolus is sufficient to disprove the idea. It does not seem that the space is large enough to uphold that objection. It is usually about $\frac{1}{8}$ to $\frac{1}{4}$ inch. It could hardly be much less unless the absorption were taken to be the direct result of pressure caused by the tartar which is scarcely tenable; whereas it is perfectly conceivable that the line of tartar should set up irritation and inflammation of gum and periosteum, and absorption of the bone, and still remain $\frac{1}{4}$ inch from its margin.

The bacterial nature of the disease is upheld by Magitot and rests chiefly upon investigations of Malassez and Gallippe who describe an organism capable of causing the formation of pus when injected into animals. The locally infective nature of the disease tends in the same direction.

Miller has made many observations on the subject and believes that local irritation may be the cause in conjunction with any condition of lowered vitality, especially rickets. He also thinks that if bacteria are instrumental in its origin, it is the pyogenic varieties, which at one time or another are present in the mouth which are at the bottom of the mischief.

According to this view such organisms as the streptococcus or staphylococcus pyogenes obtain a footing in the causation of the disease only under conditions of lowered resistance, and he accounts for the difficulty of preventing auto-infection on the ground that the predisposing cause is not removed. He remarks that there is no bacterium which inoculated into the gum of a healthy individual will produce the disease. The ætiology of pyorrhœa alveolaris should be capable of evoking discussion.

CHROMOGENIC BACTERIA.

Chromogenic bacteria demand a few words owing to the part they have been said to play in producing the brown discoloration of carious tissue. It is a matter of common observation that the

slower the process, the browner is the carious *débris*. This discoloration is not peculiar to decaying dentine but may be observed in any decomposing organic matter. Many bacteria undoubtedly have the power of producing brilliant colorations in artificial cultures and Miller has described varieties from the mouth which he thinks may be the particular varieties at work. He also suggests sulphide of iron as the pigment causing the discoloration. The green discoloration on teeth has also been ascribed to them.

MICRO-ORGANISMS OF THE PULP.

The pulp presents in a small volume a most difficult subject owing to the fact that its bacteria are at the present time the objects of much investigation. As an organ of the body it is unique. Well supplied as it is with nerves and blood-vessels, these reach it through an almost microscopic foramen and expand into a space completely inelastic. On this account it is that acute inflammation is so fatal to it. A large quantity of lymph is thrown out and the apical vessels are compressed from without. So long as life remains suppuration may take place. The question is what is the cause of this suppuration, and what is the cause of the putrefaction which frequently takes place after the death of a pulp. Observation and experiment have almost established the fact that suppuration anywhere is nearly always due to organisms though it may be caused by other forms of irritation. In the majority of cases the pulp is either exposed or only covered by a thin layer of carious dentine ; under those circumstances the entrance of bacteria is easy or at any rate possible, but suppuration may take place after a blow ; in that case they can only have obtained access through the blood-stream. This is nothing more than frequently happens in other parts of the body where localized suppurations take place in parts not exposed to the air. With regard to putrefaction the case is rather different. There is no *a priori* reason against the germs of putrefaction arriving in the same way. It is here that the comparatively isolated situation of the dead pulp is of importance. Anywhere else in the body such a portion of dead tissue would be separated from the living by an inflammatory process and either soften caseate or calcify. An infarct is analogous. Any of these results we may find in the pulp ; but a dead pulp is in the peculiar

position of being unable to be encapsuled by the fibrous material which invests and frequently partly absorbs necrotic masses in other parts. Hence the dead material is for a long time liable to the attacks of bacteria, through, it is true, a small aperture, the apical foramen, an exit too small for the absorption of the products of putrefaction. Possibly this may bear upon the fact, if so it be, that putrefaction of an unexposed dead pulp may take place, although a similar occurrence only supervenes in other parts on an exposed surface. I trust that members will bring forward any instances they may remember of unexposed putrid pulps.

The latest researches on the bacteria of the pulp are those of Miller. It is impossible here to go into his results in detail. The chief conclusions he arrives at are as follows however.

Examined microscopically cocci bacilli and spirochætia all appear in suppurating pulps, the presence of cocci singly or in pairs being a constant occurrence. In putrid pulps long stiff pointed bacilli and thread forms were more frequent. The culture experiments appeared at first sight at variance with those of direct microscopic examination, inasmuch as they usually showed either cocci or bacilli but not often both; but this is explained on the ground that the species represented by the largest number or most capable of rapid growth may outrun the others, in addition to which certain thread forms are not cultivable at all. *Streptococcus* and *staphylococcus pyogenes* were cultivated; but in much greater abundance, cocci and diplococci were cultivated from purulent pulps. From putrid pulps grew similar cocci, and rods, short or longer and slenderer. Inoculation experiments demonstrated that in producing suppuration cocci and their products were far more powerful than bacilli, though probably assisted by the bacilli of putrid pulps in producing artificial suppuration. Such are among the different phenomena which have been ascribed to bacteria. It is interesting to enquire why bacteria thrive so well in the mouth.

From man downwards through the animal scale and throughout the vegetable kingdom, we find that for each species there are certain conditions best suited to its welfare. This is particularly the case with bacteria owing to their peculiar parasitic life. A certain degree of moisture is distinctly favourable, indeed, for the great majority absolutely necessary, dessication being fatal. The spores are far more resistant than the organisms themselves.

As regards temperature we find that most, and especially the pathogenic ones, prefer as nearly as possible that of blood-heat 37° C. Naturally the more parasitic varieties have the least range of temperature. Light has been shown by Marshall Ward to be destructive to bacteria.

Oxygen is essential as to all living creatures for the oxidation of the tissues necessary for the liberation of vital energy. Bacteria however, present great differences in their behaviour in the presence of oxygen and have been divided into *aërobic* and *anaërobic* on this basis.

The *aërobic* comprise those forms which thrive best in a free access of oxygen, the *anaërobic* those which prefer to be protected from it, as for instance in the soil; to these latter a free supply is destructive to life. Between the two extremes all degrees may be found. It is interesting to note that the yeast which produces the alcoholic fermentation although arriving at the condition of greatest vitality in the presence of a free supply of oxygen, nevertheless is most active in producing fermentation when denied its pressure.

The mouth offers almost ideal conditions in most of these respects, and has always a plentiful supply of food whether taken in or already there, in the form of saliva, mucous, epithelium, dental *débris* or exposed pulps.

The practical outcome of these considerations is to keep the mouth as clean and free from *débris* as possible by the use of brushes and antiseptic tooth powders and mouth washes. At the same time it is worth remembering that to a certain extent harmless bacteria may be considered as normal denizens of the recesses of the mouth, and it has been suggested that they serve in a measure to protect the individual from the growth of pathogenic forms in the same situation.

These pathogenic bacteria find their way from time to time into the mouth and may be a source of specific infection by swallowing, inhalation or an accidental abrasion of the mucous membrane, or a septic infection may be caused by the latter in a dirty mouth or by instruments.

ANTISEPTICS.

With regard to antiseptics, perhaps the most generally useful is carbolic acid. It is much more important that an antiseptic should be rightly used than that a particular one should be chosen. For

the disinfection of instruments for instance, common cleanliness should be the precursor of a germicide, the latter only having a chance to act on a clean surface where it is in actual contact with every part.

One of the best destroyers of germ life is heat, moist or dry. As mentioned before the spores are the most resistant, but a temperature above 100° C. for a sufficient time is efficacious in killing most forms of bacteria or spores, especially with moist heat. Here again cleanliness is the best preliminary.

In the treatment of pulp cavities and root canals much difference of opinion prevails. Once more, it would appear that, putting out of consideration the peculiar methods devised for the treatment of inaccessible roots, success depends rather on complete removal of putrid contents than the attempted disinfection of septic *débris*. Carbolic is objected to as forming an eschar and so plugging the root part of the way up. In curved and inaccessible roots doubtless this is an important consideration, but in the majority of cases surely it is one of the nicest and best antiseptics to use. Corrosive sublimate is advised by others on account of its coagulating powers and consequent easy removal of *débris*. Objectors to carbolic pin their faith to peroxide of hydrogen, eucalyptus oil and iodoforme.

Except in certain instances, I have not in this paper given references to authorities. It is not always easy to say exactly whence one has derived an item of information, but of course, for his work on oral bacteriology, theses and hypotheses, Dr. Miller's name is paramount. Other works from which I have learnt have been Woodhead's "Bacteria and their Products," and for the more particularly botanical considerations, De Bary's "Lectures on Bacteria," and Sach's "Physiology of Plants."

I have tried to present the most salient points in bacteriology as applied to dental matters. It is of course difficult to choose, out of the vast number of facts and theories at disposal, those the most interesting and the most germane to the subject, and if you have any pity for me you will dwell upon the fact that bacteriology is a many-headed hydra, and in this instance the part is greater than the whole, for one of its heads is contained in the mouth.

ROOTS—WHAT SHALL WE DO WITH THEM? *

By W. H. DOLAMORE, L.R.C.P., M.R.C.S., L.D.S.

IF we recognise, and attempt to follow, the general principles which guide us in the treatment of teeth, it would seem fairly easy to know what to do with a root in any particular case. As a rule, it may be stated, that when roots are diseased, we should extract them, whilst, if they are healthy, they should be filled and left, or else treated and crowned. But when we look into the matter further, we find it is by no means so easy to define what we do actually mean by a healthy root, whilst, moreover, there are many other roots which, though diseased, may be treated, and so being rendered healthy, afterwards crowned or filled. We have to decide in each case not only whether it is desirable to attempt to save this root, but, also, whether we shall use such for the post of a bridge, the basis for a crown, or merely as a firm rest for an artificial denture. I myself feel, having regard to what shall be the most durable and useful to the patient, often in doubt of the course I may have elected to pursue. Time has not always proved me right, yet I fancy I have so benefitted by my errors, that I would purposely ask you to give the results of your much greater experience whether of happy or unfavourable results.

This is a big subject. I feel in the time at disposal I shall be but imperfectly able to do justice to its many aspects, so that I am the more loathe to delay passing to, what we are accustomed to call, the more practical considerations. Still it seems needful to briefly define what I mean by a healthy root, and to point out a few anatomical and pathological points.

By a root, I would be taken to mean a tooth, the crown of which is so broken or worn away that it can neither perform its normal function, as part of the organ for the mastication of food, nor play its part in the modification of sound into articulate speech; it is, moreover, incapable of being restored to its proper form by the ordinary process of filling. The pulp of such a tooth is either dead or in such a condition that it will soon die, which implies that an inflammatory state, possibly of septic origin, has existed or will exist in it, that has led, or will lead, to the formation of a

* A Paper read before the Notts. and Derby Dental Society.

thrombus in the pulpar arteriole at or near the apical foramen. The pulp ceases to be nourished, its cells degenerate and disintegrate, and there remains nothing but more or less fluid *débris*. It is theoretically conceivable that the initial cause may not have been septic, or, even if it were, it is still possible that no ill effects may have yet been felt by the peridental membrane. The circulation in its vessels is normal, hence the cemental cells are still nourished and are active as ever; even the tissue which is present in the interstices of the granular layer may still live; so that although the dentine may be dead, yet there being this living tissue interposed between it and the vascular membrane, it is in no sense an irritant to this. Now, if it were always possible to treat these in an ideal manner, the length of time such a tooth or root might remain firmly implanted in its socket, would be but little short of the life of a perfect tooth.

This I would call a healthy root. But, if we desire that it should remain healthy, we must absolutely fill the pulp chamber, for to leave this unfilled is simply to leave a space which will be the receptacle of all that is nasty in the mouth, a putrescent mass of *débris*, a veritable hot-bed for micro-organisms which can scarcely fail, sooner or later, to infect the peridental membrane.

In a rough and ready way it is customary to divide roots up into healthy and unhealthy, but I hope I have shown it is absolutely wrong to apply the term healthy to an unfilled root, nor can it be correct to ever leave a root in this condition. We all of us see many roots left unfilled, we often, far too often, see plates inserted over such roots and frequently we are able to note the result.

Let me remind you that the nourishment of a tooth is provided for in two directions, firstly, through its pulp, secondly, through its root membrane. The former blood supply being devoted chiefly to the progressive development of dentine, either during the initial formation of the tooth, or, later, for the purpose of opposing the advance of dental caries; whilst the capillaries present in the latter maintain the vitality of the cementum:—the absolute essential for a tooth remaining a sound organ of the human body. Now we need only to remember that the arterioles coming to the pulp and to the alveolar dental membrane are branches of the same vessel, to see at once that disease, such as a septic thrombus of one branch, can, and does

usually, sooner or later, spread to the other branch. In other words, a septic condition of the pulp means a diseased periosteum and *vice versa*; it, therefore, follows that over unfilled roots sooner or later an abscess would form, with the result that the root must either be extracted and the plate cease to fit; or if suffered to remain, the acute stage will pass, when a fistulous opening forms, and, though the root remains, a chronic discharge of pus will be continually going on into the mouth. What can be more nasty than this? What more adverse to a good state of health? Indigestion, general loss of bodily well being, sore gums and foul breath, these are the results, and who can the patient blame for all this, but we, his advisers. I should like to go so far as to say, that we are never justified in leaving an untreated root in a patient's mouth, and I am confident that such a line of practice would redound to the comfort and good health of the patient. Still I can conceive circumstances that may prevent us being quite so thorough in our methods, as, for instance, in great bodily weakness the result of disease or decrepit old age, but such cases are rare indeed, and only to be so treated with the greatest reluctance.

In whatever other manner we may answer our question, as to what we shall do with roots, one thing we most certainly must not do, we must not simply leave them alone.

I have already briefly mentioned the possible lines of treatment open to us, and it is obvious that the reasons for adopting one or the other depend on a variety of circumstances. Chief among these I would rank the position of the root, and the condition of the other teeth. We shall, of course, attempt far more if this be the only tooth a subject of advanced disease, especially if it happens to be a front one.

Some four or five years ago I was called upon to advise and treat a young lady, of about eighteen years of age, who, since childhood's days, had extremely decayed central incisor teeth. Unfortunately she had been advised that nothing could be done till she were grown up, so that decay had continued unchecked, and these teeth at the time I saw her, consisted of little more than roots, even these being much hollowed out by caries. I elected, taking into account the objection there is to a girl of this age wearing a plate, to treat these roots, for the peridental membrane was evidently affected, and afterwards to crown. A very acute abscess was the

result of my interference, though I am glad to say that after a good deal of trouble the abscess healed, and in due course the crown was fixed. For a time all went well, but it was not long before the roots were evidently becoming loose, showing clearly that the attempt to cure the diseased condition of the membrane had not been absolutely successful, and I am sorry to say that a blow from a fall on the ice precipitated to the fate of one root, though the other still holds on.

Having stated this case I would leave the judgment of the correctness or otherwise of my treatment in your hands, merely pointing out the pity that disease had not been checked years before though permanent work were delayed.

This case seems to me to furnish a very good example of the difficulty of deciding how far we are justified in endeavouring to save a badly diseased root, and I would venture the opinion that we should hesitate to attempt it unless it be situated in the front of the mouth, and that the other teeth are in a fairly good condition. Nor do I think it is ever wise to attempt it, unless we intend afterwards to crown it.

Crowns I regard as the most perfect way of restoring to use a tooth which has gone too far to save by filling. Crowns possess all the merits of an artificial denture and none of the latter's defects, but it is absolutely essential that we shall be quite sure of the healthy state of the supporting root before we proceed to fix these. Hurry is out of place in this kind of work, make-shifts are of no use, to be successful, our work must be as perfect as we can make it.

But before we elect to adopt this mode of treating roots, we must remember that it is no good to crown one root and leave great gaps in other parts of the dental arch. such cases are better treated by other means, and before turning to these there are just two other points about crowns I would touch on.

First, what minimum period of time shall we look on as satisfactory for a crown to last? My view of the matter is this. If we are restoring a denture by the use of several crowns, there should be the strong probability that they all, or, at any rate, the important ones, will last at least four or five years and probably very much longer. The failure of one, if it be a back one, is of no more importance than the absence of such a tooth, but should one, on which we are depending for mastication or for appearance, go wrong, it will lead to much disappointment, and the wish that some other

method had been adopted from the first. If, on the other hand, we are only crowning one tooth, of a denture otherwise complete, then we need have but little regard to its probable or possible duration, though doing our best to ensure this, feeling that even if we can postpone the insertion of a denture for a single year it will amply repay the time and trouble required for the operation.

The second opinion I would, with all diffidence, express, is that it is a mistake to delay too long crowning a tooth, which, by reason of the failure of fillings etc., is evidently trending that way. Please do not misunderstand me, let us, by all manner of means, fill as long as we can, *but*, remembering the natural tendency of patients not to come and see one again at the appointed time, and remembering the unfortunate tendency of frail tooth walls to break, not at the gum surface, as we would, but at another point leaving a root damaged for crowning purposes, it seems to me it may sometimes be better to be a little too premature, rather than to run the risks involved by delay.

Crowning roots naturally leads us to consider roots as a support for bridges, these being but extension of the former method. I have said that, when crowning, we may under certain exceptional conditions leave out of sight the durability of our work. This, when making a bridge, we never can. Bridge-work has been much abused and often-times has failed, and the reason, I believe, is that either too much has been attempted, or that the healthy condition of the root has not been previously assured. I would absolutely taboo big bridges, first because there is usually an insufficient support, and secondly, because, if there be enough support, it would have been better to have made the bridge in segments so that failure of one portion would not involve failure of all. It is not possible for me to argue the whole question of bridges, but I am convinced that properly made, and supported on good and sufficient bases, with self-cleansing spaces left round them, they are the most comfortable dentures that can be worn. As we are simply dealing with roots we can for the time beg the question as to whether it is justifiable or not to mutilate good teeth to obtain support for a bridge, I would only sum it up as a somewhat doubtful practice. In dealing with roots no such difficulty arises, and I am sure that when the absent teeth are not more than two or three, and good strong roots or pulpless teeth are available as

supports it is an almost ideal method of treatment. As regards the durability, I would only add that I have myself worn a bridge for some six years, and its supports are still good and sound. I should regard six years immunity from the nuisance of a plate and of the evils to other teeth which often result therefrom, as a sufficient recompense for the troubles incident to the making of a bridge, with a good fee thrown in.

Bridges are, of course, only adapted for insertion in the mouths of youngish people, but for these, especially when combined with crowns, they are peculiarly adapted. Girls, too, who naturally have an even greater objection than men to wearing plates, are eminently suitable subjects. I have had a couple of cases in which practically all the teeth were defective, which I have treated with considerable success by crowning almost all the front teeth, and by using bridges behind, where some of the roots were missing. One of these was completed a couple of years ago and is still good, the other is of more recent date. These cases I specially mention, because it is precisely when called upon to treat such, that our greatest doubts arise as to what method of treatment to pursue. They involve very considerable time and trouble if treated by crowns and bridges and much thought as to the plans on which we shall make these. I would certainly advise no one to follow this line of practice who has not ample time at his command, a large stock of patience and some experience in simpler cases.

The last points for consideration have reference to our treatment of roots present in cases to be fitted with plates. I need not repeat my reasons for desiring that roots must be either filled or extracted. Accepting this as a postulate, I would state, with regard to the selection of either of these methods, that roots at the back of the mouth should almost always be extracted, whilst those in the front should, in partial cases, be filled. The reasons for leaving teeth in the front of the mouth are obvious, an artificial tooth mounted over these has a better natural appearance, and there is not the same tendency for the muscles round the mouth to atrophy when roots are left in, hence the features retain longer their youthful appearance. Neither of these considerations can suggest our trying to save molar roots, whilst against doing so I would urge, firstly, the greater danger of our plate breaking, owing to its being gripped between the lower teeth and the

hard upper roots, secondly, the greater difficulty of satisfactorily treating these, and lastly, that these by interfering with the plate well bedding itself into the soft parts, especially in the roof of the mouth, greatly interfere with its being kept firmly fixed by the power of suction. In the case of lower dentures, it may sometimes happen that a stump will prevent the denture sinking too deeply into the gums, one of our greatest difficulties, as we all know, with these cases, and this may cause us to leave the root in ; even here, the fact, that shrinkage of the gums will sooner or later lead to loss of the root ; proves that in all but exceptional cases, our expedient has but a temporary success. When we are going to put in a whole denture that shall be retained by suction, we must be guided by many considerations in our treatment of the roots. Theoretically, it would seem that a better appearance would be obtained by the retention of the roots, practically this does not always result, and in favour of extraction we must bear in mind the much greater suction action we usually obtain thereby in edentulous cases.

Sometimes roots are used to pass a pivot into attached to the case, my experience of this treatment is not favourable to it. Such a strain is far greater than such a root can usually bear, it is far greater than would be the case, were it the support of a bridge, owing to the continual wear and tear, jerks and strains, incident to putting in and taking out the denture. I much prefer, in such cases, to crown the root and so get support for a clasp. If it is not fit to crown, much less will it be fit to act as the socket of a pivotted plate.

Report of Society.

STUDENTS' SOCIETY, DENTAL HOSPITAL OF LONDON.

ORDINARY GENERAL MEETING held Monday, October 8th, 1894. The President, A. E. CLAYTON WOODHOUSE in the Chair. The minutes of the previous meeting were read and confirmed.

On Casual Communications being called for, Mr. Torpey presented a model of a lower jaw, in which the second bicuspid was twisted round. Mr. Leigh showed three interesting specimens, one of a canine with a very long root, another of a 12 year old molar, showing well marked absorption, due to the wisdom tooth ; the

other was a specimen of a third bicuspid, which was found buried in the jawbone, the stumps of the other bicuspids being *in situ*. Its crown was enveloped in a sort of thick fibrous capsule.

The PRESIDENT said he did not know the statistics of the presence of the third bicuspids, but that this specimen was certainly a very good one.

Mr. MOSELEY said he had in his possession a mandible, in which there was a third bicuspid, the crown of which was directed towards the tongue, although the other bicuspids were not *in situ*, the socket showed that they had been lost recently.

Mr. PAGETT called the attention of members to two interesting cases of necrosis of the jaws, which lately presented themselves at this hospital. The patients were two sisters, aged four and two respectively. The history of the elder child was as follows. Although fairly healthy since birth, she had an attack of measles at the age of one month. Five weeks previous to coming to the hospital, she had a second attack of measles, which was at once followed by the four lower incisors becoming loose and falling out. Then the gum with the alveolus sloughed, and the lower lip became slightly sore. Two weeks later the upper central incisors became loose, the gum and alveolus presenting a slough. She has now lost the four lower incisors, whilst the two upper centrals are very loose. The disease is accompanied by no pain, neither is the face swollen. The case of the younger child runs thus. At the same time as her sister she had measles, and now shows the lower jaw in the same condition, the four incisors having fallen out, and the gum and alveolus presenting a grey slough. The lip in her case, however, is more infiltrated. In the upper jaw the left central is loose, and the gum is inflamed, but not so badly as in the case of her sister. The points of interest in the case, as far as I am able to judge, are firstly, the seat of the disease, the sides of the lower jaw being the more usual position; secondly, its strict limitation, so that the surrounding parts are in no way affected, hence there is no swelling of the face, and thirdly, the unusually early age at which necrosis of the jaws, after measles, has taken place in the case of the younger child. All authorities are agreed that five or six is the age most common to this disease, and give from three to eight as its extreme limits. Even Salter, who seems to have devoted most attention to this subject, though he may not be a recent authority,

comparatively speaking, states that between three to eight is the extreme limits within which he has met with these cases; and when we remember that he had an experience of over 15 years at Guy's as dental surgeon, we must agree that the age of this case is exceptional. I lay stress on this last point, because, although I have searched a quantity of literature on the subject, I have not found a record of any case occurring in a patient as young, and should therefore be glad if any member present can inform me of any case of necrosis after measles occurring at as early an age as two, or in any other way parallel to the case I have mentioned.

Mr. T. W. SMITH gave some notes on a case of removal of an epulis. The patient was a woman, *æt.* 27, who first presented herself at this hospital about the middle of August. The epulis was saturated in the bicuspid and molar region of the right side of the upper jaw. In size it was about that of a walnut, being attached by a broad base to both alveolar plates. The stumps of the two bicuspids and their first and second molars were *in situ*, and also the wisdom tooth. The patient was wearing a metal plate, which having ulcerated the surface was causing pain. The growth was noticed about a year ago, and after being removed by a ligature, reappeared in a month's time and rapidly increased in size, being somewhat soft at the time when first seen. The removal was performed in the following manner; the outer and inner halves were excised, the molar stumps removed, and the gum and alveolus freely cut away. The hæmorrhage, which was rather free, was stopped by firm pressure with pad and bandage. Two days after removal, the wound was quite healthy and quite healed in a month, the wisdom tooth, however, was rather loose. The operation took a considerable time, no anæsthetic was used, and there was very little pain, except in the extraction of the stumps.

Mr. W. H. TURNER presented models of two cases, the first was that of a man, *æt.* 63, who came to this hospital complaining of pain in the right side of his mandible. On examination, it was found that he was cutting his wisdom tooth in front of his second molar. Going into his history, it was found that at the age of about 30, he had his first molar extracted, 10 years after the extraction he cut his second molar, that is, at 40 years of age. He had suffered pain from the tooth for about four days when it was cutting through the gum. He came to the hospital a fortnight after his first visit,

and the tooth had grown well above the gum, and very rapidly, considering the age of the patient. The tooth was decaying in its mesial border, but the second molar showed no signs of decay and was perfectly firm. The few interesting points about the case are the dates of the eruption of the second molar and the wisdom tooth, and also the exceptional position of the latter, namely, in front of the 12 year old molar. The second was that of a man, *æt.* 22, who came to this hospital, having extensive caries in a molar tooth, which was extracted, and on inspection of the other teeth, I noticed a central upper incisor with a crown resembling a molar tooth. It was found out that the patient had his permanent incisor extracted two years previously. This tooth proving to be a supernumerary tooth.

Mr. NORMAN, on behalf of Mr. H. Lloyd Williams, presented an upper central, showing well marked dilaceration.

Mr. CLARENCE showed some interesting specimens. The first one was a right upper wisdom, with a small canal running in towards the pulp, about one third from the apex, the canal, however, did not pierce the nerve, but only gave an illustration of the pain and acute periostitis that might have arisen from the application, the small cavity was in some manner absorbed, and about the size of a pin's head. The second was a model of what he considered to be true germination of supplemental lateral to the lateral tooth in a patient, aged 35 years. The third was the malposition in a marked degree of the left upper central, so much so, that it had completely taken the position of the right upper, this tooth overlapping the occupant of its own space.

The PRESIDENT then called upon Mr. N. G. Bennett for his paper on "The Micro-organisms of the Human Mouth." (See page 497.)

The PRESIDENT said that most people had not much chance of studying micro-organisms. One was often asked whether smoking was good for the teeth or not; some Italian authority said that nicotine was inimical to micro-organisms, so that a slight amount of smoking might do some good to the teeth.

Mr. D. P. GABELL asked if the capsules formed around organisms had any effect as regards antiseptics, also, did he understand Mr. Bennett to say that germs could live absolutely without oxygen. As regards teeth in which the pulps had died without any caries, he had seen two cases which were both

secondary to a swelling in the gum, for which no cause could be found. The antiseptic mouth washes as generally used for about a minute, were, in his opinion useless.

Mr. W. J. MAY thanked Mr. Bennett for the masterly manner in which he had brought a somewhat difficult subject within the understanding of those whose knowledge was limited. As regards the effect of smoking on the teeth, he had seen it stated, but in what authority he was uncertain, that it was not so much the nicotine as the smoke that was inimical to micro-organisms. Tomes says that no antiseptic mouth wash was of much service when used alone. Mr. Gabell asked Mr. May if Miller was his authority, because in that case the experiment was so arranged that all the nicotine would enter the culture.

Mr. J. F. COLYER said that pyorrhœa alveolaris was, in his opinion, a progressive destruction of the tooth membrane. In some cases tartar was deposited in small patches some distance away from the socket of the tooth, whilst in others no deposit took place at all, notably in syphilitic, and in these occurring after any of the exanthematous fevers, and therefore tartar was not the only cause. Messrs. Bland Sutton and Newland Pedly hold that the disease is a constitutional one. Most certainly it occurs in syphilis tuberculosis, in any disease where there is peripheral congestion from any cause, and, in fact, in any condition in which the vitality of the tissues was lowered. With regard to the use of antiseptics in immediate root filling, he understood that hydrarg. perchlor. was the thing to be avoided, but that hydrogen or sodium peroxide were the best and most generally used.

Mr. N. G. BENNETT having briefly replied, a vote of thanks was accorded to him and to those gentlemen who had brought forward Casual Communications, and the President announced that the next Meeting of the Association would take place on November 12th, when Mr. W. S. Nowell, M.A., will read a paper on "Some Methods in Mechanical Dentistry."

News and Notes.

MR. GEO. HERN, L.R.C.P., M.R.C.S., L.D.S.Eng, has been appointed Assistant Dental Surgeon to the Dental Hospital of London.

THE Dinner of Past and Present Students of the Dental Hospital of London will be served on December 1st, in the Whitehall Rooms. Hotel Metropole. Mr. S. J. Hutchison will preside.

THE Annual Dinner of the Past and Present Students of the National Dental Hospital will be held on Friday, the 30th inst., at the Holborn Restaurant, Sir Walter Foster, M.P., M.D., in the chair.

MR. ARTHUR W. W. BAKER, F.R.C.S.I., and Mr. R. Theodore Stack, F.R.C.S.I. have been elected Examiners for the Licence in Dentistry of Royal College of Surgeons in Ireland. The next examination will be held on Monday, Nov. 12th.

THE Scholarship of 60 guineas, at the Charing Cross Hospital Medical School, open to Students of the Universities of Oxford and Cambridge, has been awarded to Mr. William Cecil Bosanquet, of New College, Oxford. The Entrance Scholarship of 120 guineas has been awarded to Mr. A. K. Taylor and that of 60 guineas to Mr. Ernest Lewis Tilley.

THE arrangements of the Odontological Society for session 1894-1895 are, November 5th. Conversational Evening. December 3rd, Paper by Mr. W. J. Collins, "Orbito-Maxillary Diseases." January 14th, Paper by Mr. C. S. Tomes. February 4th, Paper by Mr. Howard Mummery. "Photography in the Study of Dental Microscopy." March 4th, Paper by Mr. E. Lloyd-Williams, "Some Experiments with Plastic Filling Materials." April 1st, Paper by Mr. G. G. Champion. "Studies in Superior Protrusion." May 6th, Paper by Mr. Storer Bennett, "Further Experiences with Hinge Bands," &c. Paper by Mr. J. F. Colyer, "Pyorrhœa Alveolaris." June 10th, Annual Meeting. A Dinner will be held during the month of May, the date, however, is not definitely fixed.

WHILST a good many other Medical Schools were celebrating the beginning of another medical year by their members dining together, Charing Cross was "At Home" to receive and amuse its friends.

The School-buildings were prettily decorated and many amusements were provided. A Lecture on "A Tour in Greece" by Dr. Abercombie, and a Concert, and a Musical Dialogue entitled, "Love me, love my dog" were the principle attractions, though other rooms were occupied by Microscopical Exhibits, Edison's Phonograph and a loan collection of Pictures and of many other interesting objects. Nor must we neglect to mention the distribution of Prizes by Prof. Macalister, among the winners of which we are glad to notice the names of several dental students.

THE gentleman, to whom we refer in a question on page 453, writes as follows :—"If one has passed the outer portal of the R.C.P., surely there is no harm in letting the fact be known, especially when situated in a district where one's keenest competitors are the *assistants* of sine-curriculo *advertising* men. There is certainly nothing deceiving or misleading in it [as there is in the use of such a term as "First B. Sc."] though it is better to use the word "Undergraduate" only for expressing a University relationship."

WE are glad to acknowledge the receipt of the Transactions of the Guy's Hospital Dental Society. This student's society is of recent date and is an off shoot of the Guy's Physical Society, in the medical and surgical atmosphere of which the dental students efforts, seemed, to themselves, to play an inadequate part. We have the second number of these Transactions before us and it is most creditable in its "get up." We notice therein a case, recorded by Mr. Hopson, in which after extracting a lower wisdom tooth it was found that the mandibular were passed externals to the posterior root of the tooth and then round between the roots, hence an eighth of an inch was removed with the tooth, anæsthesia followed, the patient having gone abroad, the subsequent history was lost.

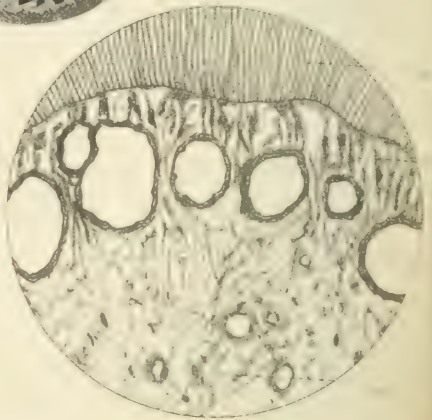
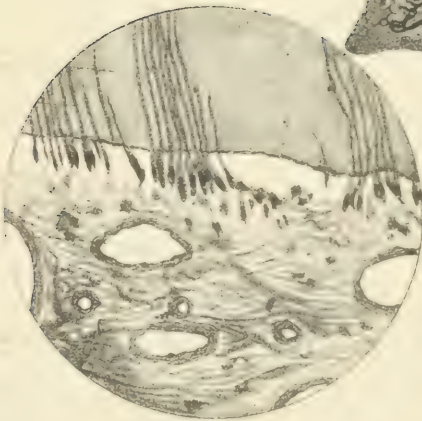
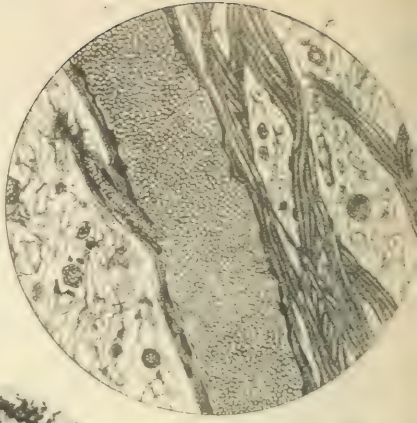
A WARNING may be taken from a case recently recorded in which damages were awarded an old lady, who claimed against a dentist, because he, finding a case past repairing, re-made the piece, asking only the fee he had undertaken to ask for the repair. The old lady having an affection for the old piece claimed damages for its loss. His Honour is reported to have shown a knowledge of dental mechanics, he having, in his youth, received some instruction

from a dentist. If this be so, we can only wonder the more at his verdict, but at the same time we would point out the folly of ever doing more for a patient than he or she has consented to have done. If a case should not be repaired, being too old, say so, and stick to it.

ROBERT GOULD, attendant on the male insane at the St. George's Workhouse, has twice been so "mauled" that some teeth have been knocked out and others damaged. Poor Robert Gould! And now the Guardians will ask the Local Government Board for leave to supply him with a "new upper jaw" at a cost of £8 8s. Lucky Robert Gould!! Yet another Board of Guardians is going to order a supply of tooth-brushes. A third, at Sedgefield, have reduced an out-door relief allowance from 5s. to 2s. because the recipient had been able to procure some false teeth. Moral to intending paupers: Get your teeth seen to first.

INCIDENT.—Dr. Battershell relates the following in the *Ohio Journal*. About seven years ago, a German tramp presented to my friend, the jeweller, a partial denture to be repaired. The plate was brass; the teeth, three in number, were of bone; he had constructed them himself, so he said. From the crudeness of the piece—soft solder being used to unite the teeth and base—he was credited with a truthful saying. How he formed the plate to fit the mouth (it was an adhesive plate), and how he filed the bone to resemble teeth is not known. However, the classically wrought bones matched his own shady masticators passably in shape, size and color. The base seemed to have agreed with him quite as well as silver or gold—because he was a tramp?—perhaps!

WE quote the following from the *Dental Headlight*:—"The odor of iodoform, creosote, or guaiacol upon the hands can be overcome by washing with linseed meal. Articles having an odour of iodoform may be washed in tar water to which oil of wintergreen has been added. The taste of pills of creosote can be disguised by means of a little powdered coffee. The odour of iodoform or guaiacol in rooms can be dissipated by burning coffee.—*Deutsche Medicinal Zeth.*"





Description of Plate VII.

Fig. 1.—Transverse section of the pulp of an adult bicuspid (human), at the broadest part of the extreme radicular region of the tooth; prepared by the author's process: stained hæmatoxylene: $\frac{1}{8}$ inch objective and A ocular: shews (*a*) dentine: (*b*) the insignificant nature of the odontoblasts: (*c*) large capillaries at the periphery of the pulp: (*d*) pulp tissue.

Fig. 2.—Longitudinal section of the pulp of an adult canine (human) at the apex of the radicular region; author's process: stained rubine: $\frac{1}{8}$ inch and A ocular: shews (*a*) dentine: (*b*) insignificant odontoblasts: (*c*) tubules corresponding in direction with the long axes of the odontoblasts and coincidence of absence of both: (*d*) pulp tissue: (*e*) capillary, obliquely cut.

Fig. 3.—Vertical section of the mandible of a foetal kitten, injected to shew the vascular supply, hardened in Müller's fluid and alcohol: general tissues stained carmine, vessels injected with Prussian blue: 2 inch and A ocular: shews (*a*) external set of capillaries, supplying: (*b*) gum, (*c*) enamel organ, and (*d*) ameloblasts: (*e*) internal set, supplying (*f*) pulp, and (*g*) various peridental tissues.

Fig. 4.—Longitudinal section of the dental pulp, hardened in Müller's fluid: stained chloride of gold: $\frac{1}{8}$ inch and A ocular: shews (*a*) capillary filled with blood corpuscles: (*b*) capillary wall: (*c*) bundles of nerve fibres: (*d*) pulp tissue.

Fig. 5.—Fibrous stroma of pulp from temporary tooth of a monkey: hardened in perchloride of mercury and alcohol: stained carmine: $\frac{1}{8}$ inch and A ocular: shews (*a*) large fibres: (*b*) delicate reticulum of fine "supporting fibres."

THE DENTAL RECORD.

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Original Communications.

DENTAL MICROSCOPY.*

BY

Mr. A. HOPEWELL SMITH, L.R.C.P.Lond.,
M.R.C.S.Eng., L.D.S.Eng.

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(Continued from page 497.)

ON THE INJECTION OF CAPILLARIES, AND ON THE MEASUREMENT AND DELINEATION OF OBJECTS.

THOUGH falling outside the scope of dental microscopy, the injection of the blood vessels of organs, is of great interest to the enthusiastic student. The study of the relationship which exists between the vascular supply and the dental tissues themselves is also of importance, since it may throw occasional light on the causes of deviations or aberrations from, and suppressions of, certain typical forms. This study cannot be followed without a knowledge of the methods of injecting these vessels.

Vascular injection may be either natural or artificial: by the former is implied, the retention of blood corpuscles within the capillary walls—best observed in sections of fish's teeth (vaso-dentine), the pulps of which have been hardened in Müller's fluid, and cut *in situ* [see Plate VIII., Fig. 3]. Artificial injection means the method of filling the vessels with an extraneous medium.

*Natural and
Artificial
Injections.*

*NOTE.—The drawings throughout this work are made for the most part, from original photographs.

This medium may have for its basis water, glycerine, or gelatine combined with a colouring matter. When employing fluids, of which gelatine is the vehicle, it is necessary that the animal should be kept at the temperature of the body throughout the manipulations: and this is obviously inconvenient. For dental work, perhaps the most suitable method is the following:—

*Modus
operandi.*

Procure a small animal, such as a kitten, or rabbit, and subject it to the vapours of chloroform, in which a capsule containing three minims of nitrite of amyl has been crushed.

*Preparation
of the
Animal.*

Immediately after death, lay it on its back, and fasten its stretched out limbs on to a board, which should be placed in a large shallow tray. Remove the sternum with its attachments, and expose the pericardium. Snip this through with scissors, and finally cut off the apex of the heart, opening up the right and left ventricles.

On a shelf, at the height of five or six feet above the table, place two Wulff's bottles, one containing an abundant supply of warm normal salt solution, and the other the injection mass, made according to the following formula:*

Pure Glycerine ...	...	...	...	4 ounces.
Tincture of Sesquichloride of Iron ...	...	...	...	20 drops.
Ferrocyanide of Potassium ...	...	...	...	6 grains.
Strong Hydrochloric acid ...	...	...	...	5 drops.
Water ...	...	...	...	2 ounces.

To a syphon, in each of the bottles, attach a piece of long, thin, flexible, india-rubber tubing, which has been previously rinsed through with a stream of water. On the free end of each tube fasten a stop-cock. Exhaust the air in the dependent tubes by

*This is a slight modification of Dr. Beale's Prussian blue solution, as suggested by Mr. Charters White.

suction, thus causing a stream of salt solution in the one, and the injection fluid in the other. Stop the flow by turning off the stopcocks. The weight of fluid in the two tubes will insure a continuous and uniform flow through the blood vessels of the animal, being of sufficient weight to overcome the normal resistance of their walls.

Pass the nozzle of an injection syringe through the left ventricle of the heart, into the orifice of the arch of the aorta, and, when in position, tie it firmly to the vessel walls by passing a threaded ligature needle underneath and around it. Insert the stop-cock attached to the tube, containing the saline solution, into the nozzle, avoiding the entrance of air, and turn the tap. The fluid should immediately commence to flow into the arterial system, and at the end of about half-an-hour run out with a clear steam from the right ventricle, showing that it has circulated through the whole of the arteries, capillaries, and veins of the animal. Again avoiding the entrance of air, rapidly substitute the second for the first stop-cock, and the gradual diminution of the injection mass in the Wulff's bottle will denote the rate at which permeation of the blood vessels is taking place. Examine the tongue and conjunctivæ of the animal, and, when they assume a bluish tinge, the operation may be stopped. On the completion of injection, turn off the stop-cock, ligature the artery, tying a reef knot, and remove the nozzle. Finally, lay the animal in a deep dish of cold water for an hour. Excise the mandible, divide it at the symphysis, and place the halves, after further division, in Müller's fluid till they are hardened. Complete the process by immersing the pieces in alcohol, afterwards, imbed

*Washing out
the Vessels.*

*Their
Injection*

*Final
Treatment.*

in gum mucilage, and cut on an ether-freezing microtome. Stain the sections with carmine.

THE MEASUREMENT OF OBJECTS.

It is often convenient, in giving descriptions of histological specimens, to be able to make a note of the dimensions, as well as the shape and general appearance of the object. This would be very difficult without an acquaintance with the several methods which have been devised. The size of cells, distance between dentinal tubules, length and width of interglobular or other spaces, etc., may be obtained by using a stage-micrometer, singly or else combined with either a camera lucida, or an ocular micrometer.

The Stage Micrometer.

*Instrument
for Measur-
ing Objects.*

This consists simply of an ordinary glass slide, ruled at its centre, with microscopic, diamond-cut lines, which are separated from each other by fractions of an inch or millimeter. The stage micrometer alone almost suffices for measuring objects, but, if used in combination with a neutral tint reflector or eyepiece micrometer, it will form a very valuable adjunct to the student's microscopical outfit.

The lines on the slide are equidistant, and are either hundredths or thousandths of an inch apart in the English form, or tenths or hundredths of a millimeter in the Continental model, and when focussed and viewed as a transparent object, they appear sharp and clear in the field of vision.

Method of Using.—Put the microscope in a vertical position, with the specimen on the stage. Focus the latter and by keeping both eyes open, observe its faint image thrown on to a piece of white

paper, lying on one side of the microscope on the table. Without moving the position of the eyes, trace the outline with a pencil. Remove the slide, substitute for it a stage micrometer, still keeping both eyes open, and the lines will appear faintly drawn across the sketch. Point off these lines with a pencil and rule them across. Note the combination of ocular and objective, the height of the eyepiece above the paper, and the extent to which the draw-tube has been drawn out. Calculate the size of the cell by computing the number of spaces it occupies between the lines, the distance of which is known.

This is, at best, but a rough method of measuring the size of objects. More trustworthy data can be obtained by using a stage micrometer with a camera lucida or tint reflector. Beale's neutral tint reflector is a small circle of tinted glass mounted in a metal frame, and attached, by means of an arm at an angle, to a ring which is intended to be slipped over the tube of the eyepiece. The reflector does not magnify the object, but when in position, it projects the image on to a piece of white paper.

*Beale's Tint
Reflector.*

The Stage Micrometer, and Reflector Combined.

Method of Using.—The micrometer is fixed on the centre of the stage, and the microscope tilted horizontally, having the reflector at an angle of 45° to the eye lens of the ocular. If the micrometer is well illuminated, and the observer's eye looks from above through the reflector, the lines will be seen projected on the paper underneath. These lines should be measured and pencil marks made on the paper, to be ultimately ruled in pen and ink. By subdividing the lines, thousandths or other greater fractions of an inch can be estimated, and these

again converted into millimeters or micromillimeters, according to the following scale:—

1 centimeter (cm) = 10 millimeters.

1 millimeter (mm) = 1,000 micromillimeters (μ).

25 micromillimeters (25μ) = $\frac{1}{1000}$ of an inch (approximately).

*Micrometer
Chart.*

The distance between the centre of the eye-lens of the ocular and the paper being known, it is not a difficult thing for the student to make a chart bearing these lines upon it.

Thus:—If a $\frac{1}{4}$ inch objective and C ocular are used, and the paper is lying on a plane distant five inches from the centre of the eye-lens of the ocular, then on the paper—

$\frac{1}{100}$ inch will measure three inches nearly.

$\frac{1}{1000}$ inch will measure $\frac{3}{10}$ inch nearly.

The micrometer having now been removed from the microscope stage, and the section inserted in its place, it is only necessary to sketch in pencil the outlines of cells, distances between dentinal tubules, on the chart, over the lines, to easily make the desired measurements. These should only be taken at the centre of the disc of light thrown on the paper.

The Ocular Micrometer.

*Another
Method.*

A still more easy and reliable method is to employ a stage and eyepiece micrometer together, the microscope body being, in this instance, kept in an upright position. The ocular micrometer consists of a single circle of glass, the scale of which is divided into hundredths of an inch. It is made to slip into the eyepiece between the lens and field glasses. If this is used instead of the tint reflector, two sets of lines will appear in the field of vision. When in focus, it is first necessary to determine how many divisions of the ocular micrometer occupy one

space of the stage micrometer. The proportion they bear to each other must be noted, and when the section is placed on the stage and focussed, the size of its cells, or other constituents, can be estimated by remembering that so many of the lines seen over the section equal $\frac{1}{100}$ of an inch.

THE DELINEATION OF OBJECTS.

The ability to reproduce on paper the chief features of his sections will be of great service to the student during his study of dental histology. Some workers can make drawings of their preparations with great ease, by mere inspection of their structure through the microscope; but the majority find this a difficult matter, and it certainly requires long practice before anything like perfection is reached.

But, by employing a camera lucida, or Beale's reflector, as already hinted, useful sketches of the tissues may, with a little trouble, be made by anyone.

*Instruments
for Drawing
Specimens.*

The arrangement of apparatus is similar to that just described,—the microscope horizontally fixed, the reflector in position in front of the eyepiece, and the section well illuminated by means of lamp-light. The intensity of the illuminant should be modified until a point is attained at which the image, seen through the reflector, is at its best.

*Method of
using.*

There has, however, always been a certain amount of difficulty attending the use of the camera lucida, or Beale's neutral tint reflector, for the purpose of making microscopical drawings. The twisting of the head into an uncomfortable position, the great fatigue to the eyes, and the by-no-means easy task of viewing both image and pencil at the same time, add to the troubles of making a faithful reproduction of the object on paper.

*Alternative
Method.*

To those especially, who do not possess a camera lucida, or Beale's instrument, and to students generally, the following arrangement of ordinary apparatus may be recommended:—The microscope body is placed in a horizontal position, and the mirror removed from its sub-stage attachment. The microscopic slide having been placed on the stage, the illuminant (lamplight for choice) is "condensed" on to the slide by means of a "bull's-eye," in the same way as for photo-micrography. Care must be taken to "centre" the light. A concave mirror is then attached to the front of the eye-piece of the microscope by a piece of thin wood or a spring, having its surface at an angle of about 45° with the plane of the eye-lens of the ocular. The image is thus projected on to the paper beneath. No distortion will occur if the outer ring of light is *perfectly* circular. A dark cloth, such as photographers use, is thrown over the draughtsman's head and the body of the microscope, and all light excluded save that which passes through the microscope lenses. Any section can thus be easily, rapidly, and comfortably drawn, and fairly accurate representations obtained of objects magnified up to 500-600 diameters.

(To be continued.)

TEETH OF IMPAIRED VITALITY.*

SOME OBSERVATIONS REGARDING THEIR TREATMENT.

By WARWICK HELE, L.D.S. Eng.

I do not propose to enter upon the Pathological changes, which accompany the loss of vitality in a tooth, and the corresponding treatment, but rather to briefly indicate some points of everyday practice.

*A paper read before the North of England Odontological Society.

Suppose then the case of the first visit of a new patient, who has applied for treatment in consequence of recent suffering, one of that numerous class, who frankly express their fear of pain, but who profess to have their teeth duly attended to.

As a rule, the brief examination of such a mouth, by speculum and probe, reveals a miscellaneous collection of filling material dispersed amongst the remains of teeth, remarkable for their unkempt condition. There is no doubt, but that in such a mouth there will be found teeth of impaired vitality. Unfortunately, from the shrinking fear of such a patient, no statement may be relied upon as a certain fact, and we have to resort to well known tests, and note the effects of percussion, change of temperature, and any variation from normal colour, as safer guides.

Suppose now that we have hit upon the tooth approximately the cause of pain, the question arises whether the little spark of vitality is to be preserved or destroyed. "To be or not to be, that is the question." I do not pretend to give an *ex cathedra* answer, but only to state what I have found the most satisfactory average treatment in my own practice.

If the patient states that such a tooth has been the cause of only one distinct attack of toothache, and has been speedily relieved by some simple home remedy, and "has never ached since." I think we may rely on the fact that its vitality has not been fatally impaired; but I make it an invariable rule to test by dressing, and I remove the carious portion with spoon-shaped excavators, so as to create as little renewal of irritation as possible, before proceeding with any filling operation. First, then, after the removal of the caries, I acquire approximate dryness of the oral cavity by means of pads of Japanese bibulous paper, packed under the tongue and against the cheek, or over the palate and against the cheek, but in very wet mouths I always apply the cofferdam; I then dry out the tooth cavity by means of chloroform, and, leaving in the cavity a light pledget of cotton wool steeped in campho-phenique, during the next minute I prepare a suitable pledget of cotton wool, steeped in a saturated solution of benzoin, which has had five grains of pure carbolic acid, and one scruple of tannic acid dissolved in each ounce, the formula of the late John Rigdon Mummery.

In order to prevent the chilling action of the volatile spirits of wine, I place the prepared pledget of cotton wool, so steeped, in

the flame of a spirit lamp, withdraw it, and allow the superfluous spirit to burn off, by which means my pledget is brought to a suitable temperature. I then pack it, lightly but firmly, within the cavity, where it quickly sets by cooling.

This pledget remains for three days, if no pain be experienced.

On the lapse of that time, again obtaining a dry oral cavity, and then removing the pledget of benzoin dressing, by applying thereto what Sheffield was pleased to call the "nasal test," any malodorous condition at once shows whether the tooth may, or may not, be saved alive. If the tooth proves to be aseptic, but if the direction of any remaining softened dentine points to its near contact with the pulp cavity, I apply some of Poulson's Cement Plombe over the suspicious portions, and after waiting until it is set, then proceed to make sound walls by excavation, for the reception of a permanent stopping. In other words, though I hope my test has answered, and has prognosticated a favourable result, I advocate the capping of the pulp chamber to prevent any metallic contact.

On the contrary, supposing the test discovers malodorous emanations, we may take it for granted that further trifling will prove, in the majority of cases, a waste of time. I then proceed to business, and find out from the patient as to what possibilities there may be of future visits at certain dates. If, from inaccessibility, or any other cause, the patient's difficulty of frequently returning is a factor, then, the point to be argued with the patient becomes one of prompt extraction of the tooth, or extirpation of the pulp. Most patients shrink from the latter course, and may prefer the former, with the gas to aid their stoicism.

I will not presume to enter upon the broad question, before this learned society, as to which course pays the dentists best. We are members of an honourable profession, but we cannot always disregard the hard realities of remuneration, so each must be left to judge for himself, unaided by my little glow-worm lamp, how best to answer this question. But frankly for myself, I am bound to say, the dead tell no tales, and the death of such a tooth, by its extraction, seems to me the simplest way, in the majority of cases, both for the patient and the dentist.

Supposing, however, the tooth of paramount value, and the patient willing to sustain prompt and heroic treatment, I do not hesitate to say that extirpation of the pulp should at once be

performed. If a 10 per cent. injection of cocaine be made in the gum tissues surrounding that tooth, and then a drop of a saturated solution be driven into the pulp chamber, the operation may be skilfully performed with at least not more pain than is experienced in many other dental operations. I would myself infinitely prefer to suffer it than the slow excavation of a tooth with highly sensitive dentine. Granted an open pulp chamber, and a tolerably straight-fanged tooth, a small Gates-Glidden drill, with slender shaft, rapidly revolving, is a most efficient instrument.

If the patient cannot face immediate extirpation, but can undertake a sufficient attendance in the dentist's chair for slower methods, I prefer making a distinct exposure of the pulp. I prefer applying arsenious acid together with carbolic acid, direct on to the pulp, of such a bulk as to cover the exposure, and I prefer capping the dressing with stout cardboard, in such a manner that it shall not be pressed upon by the superimposed protecting cover, whatever that may be.

I prefer covering such arsenious dressing with gutta-percha filling material, Flaggs' G.P. or Waite's red rubber by preference, to render the escape of arsenious acid as little as possible; and this I do in consequence of an early hospital experience, wherein I saw the whole of Steno's duct laid open, owing to the escape of a portion of arsenious dressing from a wisdom tooth with roughened edges, which had only partially been protected by a resinous cover.

I never willingly disturb such an application under three days, and most generally find a five days exhibition produces the best result. Here the so called disruptive inflammation stops short of the termination of the pulp fibril at the root apex.

Of course, I advocate complete extirpation, if it can be accomplished, and direct root filling; but whilst in the confessional I must cry "*O mea culpa!*" I but rarely, except in the oral teeth, satisfactorily accomplish complete extirpation. But, notwithstanding this, I have saved, as my notebook of nearly 30 years standing will show, a fair average of teeth treated.

Now comes the question, What is the best average root filling?

I think I have been induced by my kind London brethren to try all those panaceas, which have by turn promised, not only to be the best, but the *only* satisfactory material. And I have come down to the jog-trot use of eucalyptus or cinnamon oil, with iodoform for

back teeth, and eucalyptus or cinnamon oil with cement plomb powder for oral teeth, my reason being, that in the front of the mouth, it is desirable to avoid the use of the better material, because, unfortunately, the use of iodoform, as a root filling, does produce a blueing of the tooth substance, though no amalgam or other staining material has been employed for the crown filling.

The limit of my communication has been reached, or I should have entered upon the advisability of the use of platinum probes, for the application of the root dressings; I should also have touched upon the so-called Coleman method of dealing with valued but partially dead, and sometimes putrid teeth, of which system I can speak most highly, but to which there is one strong objection, *viz.*, that heretofore there has been no permanent mark adopted, to be made upon every tooth so treated, that such might be universally recognised by all dentists. I should also have dwelt upon the great value of Dr. Cunningham's one per cent. solution of arsenious acid in glycerine, for the dressing of the lower extremity of the root where some portion of the pulp remains.

But all these topics will form the *point d'appui* for discussion, or for subsequent papers by some members of our Society better able to discourse upon the whole matter than myself.

So, in conclusion, Mr. President and Gentlemen, referring again to the unfortunate disability of patients to give exact information regarding their own cases, I think it is of the very first importance that accurate notes be taken of every operation performed, so as to be of ready reference. And of treatment and results, there is nothing in the whole province of dentistry in which such a register is so necessary, as that having regard to the treatment of teeth of impaired vitality.

SOME METHODS IN MECHANICAL DENTISTRY.*

By WALTER S. NOWELL, M.A., Oxon.

MR. PRESIDENT AND GENTLEMEN.

"Some Methods in Mechanical Dentistry" is the title of the paper which I have the privilege of reading before you this evening. The subject is one with which you are all perfectly familiar, and consequently you must be aware how impossible it is to cover much

* A Paper read before the Students' Society of the Dental Hospital of London.

ground in the time at my disposal. I have endeavoured to describe those methods of working that I have myself found best, hoping that by doing so I may chance to touch upon some points that may be worthy of your attention. Inasmuch as we all intend to spend the major portion of our future in the surgery and not in the workroom, I have written my paper with that idea in view, and so have taken the liberty to stray occasionally from the workroom into the surgery.

IMPRESSIONS OF THE MOUTH.

When we consider that all the subsequent steps in the construction of a dental substitute are as labour thrown away, unless the model is practically perfect, one cannot insist too strongly upon this initial operation being performed with the utmost care and to the best of our ability.

Before an impression is taken, the mouth must be properly prepared, and brought into as healthy a condition as possible. To do this, we must :—

- (i.) Remove all useless and hopelessly diseased teeth.
- (ii.) Remove tartar.
- (iii.) Fill cavities, either permanently or temporarily.
- (iv.) Loose teeth should usually be removed, but sometimes they are of use in preventing a lower plate slipping forward. As a rule leave loose teeth in old persons.
- (v.) Roots : If they preserve the contour of the face, leave them, especially in the case of ladies. Save lower bicuspid roots, as they prevent the plate from sinking. Molar roots in both jaws should be extracted.
- (vi.) After removing teeth a temporary plate should be inserted at once. It will be from six to eighteen months before a permanent plate should be made.

Assuming that the mouth has been prepared and in an healthy, condition, the next step is to select a suitable tray. Now the simpler the tray the better, and those made of pewter are the most useful as they admit of considerable alteration in form. In some few cases a special tray will be required, but it is well to bear in mind that a special tray may increase the difficulty of obtaining an impression, instead of facilitating that process. A quickly made and effective tray for a plaster impression can be constructed as follows : To the best obtainable model of the mouth adapt a sheet

of gutta percha ; fix the spoon end of a teaspoon to the palatal surface of this G.P., and use the handle of the spoon as the handle of the tray. Always carefully examine the mouth before you attempt to take an impression ; noting whether the palate is high or low, whether the intermaxillary suture is prominent or not, whether any of the teeth present marked undercuts, whether any specially defined folds of mucous membrane exist, and so on. Having taken the impression, compare it with the mouth.

With regard to impression materials, those commonly employed are :—

Plaster of Paris.

Modelling composition.

Bee's wax.

Gutta percha.

Plaster should be mixed thin, using coloured potash-alum solution. When you have filled the tray, carry the back part of it into position first, so that the surplus may find its way forward. Plaster is undoubtedly best in all edentulous cases ; it is also very good for uppers where but few teeth are standing, and for lowers where the front six or eight teeth alone are present. Plaster is essential in all cases where an accurate impression of overhanging edges, or of deep undercuts is required, *e.g.*, in taking an impression for a Kingsley's Obturator.

In nearly all other cases I prefer modelling composition, either Stent, or that having the formula :—

Stearine $\frac{1}{2}$ lb.

Finest Gum Kouri 1 lb.

French Chalk $1\frac{3}{4}$ lb.

In using composition, after having suitably filled the tray, cool the outside of the tray quickly with a napkin dipped in cold water, and glaze the surface over a spirit lamp.

Pure bee's wax is also very useful at times, especially if we desire to take models of a mouth in which very sensitive decayed teeth are present ; its lower working temperature is in such cases of decided value.

Gutta percha is spoken highly of by some practitioners, but I have never myself seen a good impression obtained with it.

Whilst taking an impression, the patient should be told to breathe through the mouth. This keeps the soft-palate well up,

and prevents any feeling of nausea ; thus lessening the discomfort of the patient, and enabling the operator to obtain a more accurate model. Sometimes we come across patients who, owing to a peculiarly irritable state of the mucous membranes and general nervousness, can not endure the introduction of a foreign substance into the mouth ; this difficulty may be overcome either by using a gargle of one in forty carbolic acid, or by painting the tongue and palate with a two to five per cent. solution of cocaine, two or three minutes before taking the impression.

Having obtained a good impression of the mouth, carefully insert pins into the impressions of any tooth or teeth that are at all likely to be broken during subsequent manipulation. If you are dealing with a plaster impression, paint it over with a thin varnish of shellac in alcohol, and when this has dried, paint it over with some separating material ; the coat of varnish need only be used where difficulty in separating is anticipated. Wash away the saliva from a Stent impression before running a model.

PLASTER MODELS.

The plaster should be thoroughly mixed, and of fairly thick consistency. Now hold the tray in the left hand ; place a little plaster at one end of the impression of the dental arch, and keep tapping the tray against the edge of the bench, so that the plaster may be allowed to find its way slowly into any depressions, expelling the contained air or oil, and thus adapting itself accurately to the impression. This done, place some more plaster on the tray, and then build up a pile of plaster on a tile or on the bench ; adjust the tray on this pile, and with a knife shape up the model as required, and leave till thoroughly set.

REMOVING IMPRESSIONS.

Removing a plaster impression requires great care. The impression tray should be dipped in boiling water, and then removed by tapping it off ; or it may be "started" by inserting the blade of a knife under its edge. Then dip the impression material again in boiling water, cut shallow grooves here and there, and keep on gently tapping, removing the pieces bit by bit as they become detached.

Composition should be thoroughly softened, either in hot water or by dry heat, before any attempt at removal is made. When quite soft, commence at one end and turn up the composition over the crowns of the teeth all the way round ; then press this fold inwards clear of the teeth, and remove in one piece.

PREPARING THE MODELS.

The models must now be trimmed up neatly and carefully inspected, any "sucks" filled in with thin plaster, slight "drags" pared away, and so on. Dry the models in an oven. If a gold plate is to be made, the surface of the model should be hardened by placing it whilst hot bodily into a saucepan, containing melted stearine ; if a vulcanite plate is to be baked on the model, it should be stearined only half way up. Any excess of stearine is wiped away with cotton wool.

HOW TO MAKE A VULCANITE PLATE.

Carefully mark out with a pencil the dimensions of the plates on the models. If clasps are necessary mark out the position of these as well, remembering that each clasp or band must be counter-balanced by another. If you know the palate to be hard in the median line, paint some thin plaster over the position of the inter-maxillary suture and lightly scrape the model on each side of this, so that the plate will not ride on the hard ridge. Also apply a layer of plaster over any stumps, and pare away the model in those positions where artificial teeth are to be let down on the soft gums.

We may now proceed to construct our trial-plates. For the upper make a zinc die and lead reverse, and strike up a Britannia metal plate (about No. 8 thickness). The lower trial-plate should be made either of stent or hard-bake (stent 1, shellac 2), using wire as a strengthener when required. Over the position of the alveolar ridge of each plate place blocks of wax or stent for the patient to bite into. These plates are rigid, and do not get broken or bitten out of shape whilst obtaining the "bite." They should be made to fit the models accurately, and carefully finished off.

TAKING THE BITE.

The next step is to obtain a correct "bite." This presents no difficulty when some teeth are present in both upper and lower jaws,

so I will only describe the method of proceeding in an edentulous case.

Place the lower trial-plate in the mouth first, remove and make any alterations that are necessary, finally cut a few grooves here and there on the biting surface of the stent, and replace. Then insert the upper plate, and see that it fits perfectly. Now tell the patient to bite gently, you will probably find that the wax or stent has been left too high in some places and too low in others, so you must keep on removing the plate, each time cutting off or adding material, until the whole of the biting surfaces of each plate come in contact simultaneously. Now remove the upper plate, soften the wax or stent over a flame, replace, and tell the patient to bite. This process must be repeated until the "bite" is of the correct height, and this point is indicated when the lips of the patient come naturally into apposition.

MARKING THE CENTRE.

Assuming that the "bite" is now correct, it only remains to mark the central line of the face on the stent. Hardly one person in fifty has a perfectly strait nose, and the only central point to be depended on is the centre of the eyebrows. So, in your mind's eye, draw a vertical line downwards from this fixed point, and mark its position on the stent with a knife. Another line drawn at right angles to this, and also marked on the stent, will give the correct horizontal line for the direction of the cutting surfaces of the teeth. You must now select teeth of suitable colour, size and pattern, and remember that different types of teeth suit different persons, according to their temperament and features.

MAKING A SLAB-ARTICULATOR.

On returning to the workroom, adjust the plates to the models, and see that nothing prevents the bite from going well home. Then hold the models in position with your left hand, fill in any spaces with damp tissue paper, paint the bases of the models with soap-solution, and make a slab-articulator either of plaster or of stent. Never relax your hold of the models until the material used for the slab has hardened. I much prefer a stent slab myself, as it never chips, and is far more pleasant to work with.

If necessary, the Britannia metal plate must now be reduced in size, so as to admit of its easy removal after flasking. The object of

this metal plate is to insure an uniform thickness in the finished denture, and a fairly exact reproduction of the natural surface of the palate. Now lightly French-chalk both models. Then warm a clean sheet of wax and mould it to fit the lower model, trimming off the surplus at the pencil line. Next complete with wax those portions of the upper that are not covered by the metal plate.

THE ARRANGEMENT OF TEETH.

We may now commence setting up the front teeth on each plate. It is well to arrange teeth according to some method, and I have found the following a good general rule:—

- (i.) Commence by setting up the four upper and four lower incisors.
- (ii.) Arrange the four canines, remembering that the lower canines bite in front of the upper ones.
- (iii.) Arrange the bicuspid's carefully, and then the molars.
- (iv.) Endeavour to keep the upper plate light; extra bulk should be relegated to the lower where possible.

Where a natural central or lateral tooth remains in the upper, it is easiest to begin by completing the upper incisors first, and then proceeding with the lowers, re-adjusting the uppers if required. In edentulous cases it is often difficult to determine the exact position for the teeth, in these cases, however, a slight ridge is nearly always visible on the alveolar border of the mandible, and this will serve as a guide, for just outside this line is the correct place for the teeth. Therefore in edentulous cases it is nearly always easiest to set up the lower incisors before the corresponding upper ones. Next arrange the four canines, and do not hesitate to alter their shape to suit the case in hand. Lower teeth look best when slightly irregular, the upper centrals usually look best if set square, the laterals being made shorter and placed a little within the arch, the canines should be set boldly with a slight tendency to lean forwards. In edentulous cases the lower front teeth should be placed well within the arch of the uppers if possible, as the lower plate is almost sure to work its way forwards, especially in old patients. Always try to avoid an "edge to edge" bite. If the bite is so much underhung that you are compelled to place the upper teeth within the lowers, it is best to place them well within the lower arch.

Having arranged these teeth satisfactorily, build up to the bite with wax blocks posteriorly, and try the plates in the mouth. Whilst the patient is present, make any improvement you can in the existing arrangement of the teeth. Should the teeth appear slightly too broad and heavy looking, this can always be altered by rounding off the angles of the cutting surfaces. It is one of the most useful facts to bear in mind, that the squarer the cutting edge the broader the tooth will appear, and, conversely, that a judicious rounding off of angles will make the same tooth look much narrower, longer, and more delicate. Now remove the plates, and once more place and fix them in position on the models.

In setting up the back teeth, I think it is best to complete one side at a time. I usually commence with the first upper bicuspid, and then proceed to the corresponding lower tooth, and when I have got these in the right position and articulating correctly, I take in hand the second upper bicuspid, and then the second lower bicuspid, and so on. Bicuspids are the most difficult of all the teeth to arrange, for so much depends on their position, appearance, and correct articulation. The first bicuspid should be so ground on its lingual aspect, as to form a gradual contour between the canine and the second bicuspid. If English teeth are employed, any ground surface can be rapidly polished by the aid of a strip of Arkansas stone and water.

Molar teeth should be kept perpendicular. There is a decided tendency to let them slant about and adapt themselves to the bite; but such alteration as may be needful for the purposes of articulation should be the result of judicious grinding only.

It is a great mistake (at all events in edentulous cases) to leave prominent cusps on bicuspids and molars. These interlocking cusps are the chief cause of plates becoming displaced, and of lowers remaining uncomfortable; since every time a lateral movement of the mandible occurs one of the following troubles must ensue:—

(i.) If the lower follows the movement of the mandible, then the upper plate tends to be displaced.

(ii.) If the upper plate fits more securely than the lower, then the lower plate cannot follow the lateral motion of the mandible, and the consequent rubbing will cause continual discomfort, or even actual ulceration.

MODELLING IN WAX.

Having completed the arrangement of the teeth, it only remains to finish the modelling. The "waxing up" process should be a neat and clean one throughout. Add very little more wax than you actually require; trim up with a warm wax-knife, and finish between and around the teeth with a fine sharp instrument. The best instrument I know of for this purpose is one that was shown me by Mr. E. Lloyd Williams; it is of a shape that you can easily make them for yourselves out of old excavators.

When the process of "waxing up" is completed, replace the models on the slab-articulator, and see finally that the bite is correct; remembering that the bite should tend to be hardest in the bicuspid region, and almost free between the last molar teeth.

METHODS OF FLASKING.

We must now proceed to flask our case. There are four usual methods of flasking for us to select from; *viz.*—(i.) Plug way; (ii.) Upside down; Two part way; (iv.) Three part way.

The flask should consist of three parts. A base, a centre-piece, and a lid. The base should be fully $\frac{1}{2}$ -inch deep; the centre-piece about $1\frac{1}{4}$ inches high; and the lid should be provided with an undercut on its inner surface for the better retention of a plaster plug. Parts I. and II. should have interlocking sorts, perforated for the insertion of pins.

(i.) *Plug way.* Here parts I. and II. are pinned together and the plate invested in them, bringing the plaster over all the teeth, leaving the palate free; separating material used, and a plug run. This is the easiest and best method for flasking any plate, where the teeth are not too near the gums; it is then easy to pack the pink rubber under the teeth and through the interdental spaces.

(ii.) *Upside down* is a method of flasking which I do not believe in myself, for there is a very great tendency to raise the bite. It is, however, useful in some repairs, and in lining an old lower plate with soft rubber.

(iii.) *Two-part way* is a useful method of flasking cases where the teeth are let down on or very near the gums. The plate is invested in part I. of the flask, the plaster being brought up to a

level with the wax all round. The plaster is smoothed off and painted over with separating material; part II. is then placed *in situ*, filled with plaster, and lid adjusted, and the whole squeezed down into place.

After packing, any surplus rubber must be removed before finally closing, else raising of the bite is nearly sure to follow. The best separator for trial purposes is the cloth sold with the rubber; this must be wetted, and should it stick, a little water poured over it will cause it to separate easily.

(iv). *Three part way* requires some little practice, but it is worth the trouble, for it combines the advantages of both "Plug Way" and "Two-part Way," without the disadvantages of either. It is simply "Two part Way" with the addition of a plug. Personally I have found it the best and most reliable method of flasking.

"BOILING OUT" AND PACKING.

Warm the flask through before attempting to separate. When you have separated the various parts and almost completed boiling out the wax, trim away all thin edges of plaster, and then complete the removal of the wax.

Pack carefully and in small pieces, keeping the rubber and the different parts of the flask warm and clean.

Always make sure that the flask is securely clamped before placing it in the vulcanizer.

FINISHING.

On removing the flasks from the vulcanizer, they should be thoroughly cooled before opening. If the flasks have been left in vulcanizer over night, some difficulty will be experienced in the thorough removal of the plaster from the plates: this is best overcome by immersing the plates for five minutes in hydrochloric acid.

In filing up, remove all surplus rubber with a fairly coarse file, and then proceed with a finer one. For the palate, a "scraper" is usually required. In finishing between the teeth, the same instrument previously recommended will be found most useful. The plates will now need to be smoothed all over, first with coarse, and then with fine sand paper, and finally polished on the lathe.

In polishing do not keep the brush too long in one position, but constantly alter the position of the surface to be polished. Special care should be taken that the edge of the plate will not press upon the frænum and malar processes, and that all edges are rounded off and perfectly smooth. It is of no use attempting to leave the sides of a lower plate at all deep.

STRIKING UP A METAL PLATE.

Time will not permit of my saying much about the art of striking up a metal plate. In doing so, however, we must avoid stretching, bruising, scratching, and notching ; whilst the following are the most important rules to be observed :—

(i.) Prepare the model, and wax over any stumps. Any part of the model that will not be covered by the plate, can be waxed over to facilitate casting or striking up.

(ii.) Make an exact pattern in tin or lead foil. In flattening the pattern, do so from without inwards, so as not to stretch it.

(iii.) Having cut your gold to pattern, file all the rough edges round and smooth, before attempting to strike up.

(iv.) Anneal the metal thoroughly, and commence by tapping the plate gently into place on the zinc die, using a horn mallet and wooden punches.

(v.) Having got the plate as well home as you can with the horn mallet, strike up in a lead reverse. It is better to strike up on a yielding surface, such as one's knee, than on a hard block. The plate should be *persuaded* to go down into place, rather than forced into position with heavy blows.

(vi.) When the plate commences to show signs of fitting, place a sheet of paper or cotton rag between the plate and the lead ; also some tissue paper between the plate and zinc die, and strike up again. Any surplus pieces of plate must from time to time be removed. The plate should frequently be placed in hydrochloric acid to remove traces of lead, and then re-annealed.

(vii.) Chase round the necks of teeth, and finally strike up with a tin reverse.

Sometimes, owing to contraction of the zinc, the plate rides on the alveoli, and does not go down on the palate : this can be overcome by placing a fold of paper on the zinc die over the

alveolar ridge. The addition of tin to the zinc (one in five) greatly prevents shrinkage. If Rugæ are unusually prominent, it is a good plan to trace out all inequalities on the lead reverse with a bone punch, previous to striking up. Should the edge of the plate "kink" in striking up, it is usually best to cut the kink right out, and if necessary solder a piece in ; but this is only likely to occur in very high and narrow palates.

BACKING TEETH.

In "backing" teeth, let the gold cover the whole posterior surface of the tooth. In filing up the backings, let the front of the tooth rest against the left thumb, and file towards the tooth. When several teeth have to be backed consecutively, the observance of this simple rule will save many a sore finger.

The backing may be fixed either by bending the pins inwards on each other, or by rivetting. Before rivetting, the holes should be countersunk, the pins cut off short, and the tooth embedded face downwards in a little hard-wax ; this material offers sufficient resistance, and yet does away with any risk of cracking the tooth.

METHODS OF RETAINING DENTURES.

(i.) *Clasps*.—There are at least three kinds of clasps :—

(a) Clasps made of band gold, and left fairly broad ; these should fit exactly round the neck and sides of the tooth. They are applicable to teeth that present but little undercut.

(b) Clasps that are made narrow and springy, fitting only round the most bulky part of the tooth. They are applicable to teeth that are obviously undercut.

(c) Clasps with a spring hinge.

Clasps should, if possible, be arranged in pairs, preferably a symmetrical arrangement on each side of the mouth should be obtained. Every clasp must have some opposing point, upon which its elasticity may be brought to bear. If but one tooth is to be clasped, the clasp should be carried nearly three-quarter way round the tooth, so that one end may counteract the other ; the posterior lip should be left longest, the anterior being cut short, in order that the latter will not show much, and yet remain efficient. Where you decide to carry a band round the posterior surface of a shallow molar, half-round wire is best. All clasps should be thoroughly

polished inside, a stick of cane, dipped in fine pumice and water is the best means of effecting this.

(ii.) *Pins*.—Pins extending from the under surface of a plate and fitting exactly into tubes inserted in prepared roots, are occasionally useful means of keeping a plate *in situ*. Mr. William Dall, in 1891, described "A Method of Preventing Upper and Lower Dentures from Slipping Forward." This consisted in inserting pins, either into prepared roots, or into the sockets of removed teeth, or actually drilling holes for their reception. I do not think that many would consider themselves justified in performing the latter operation, but his other methods are well worth remembering. Placing pins in sockets of teeth recently removed, is of service in assisting the retention of a plate at first. After a time the sockets appear to granulate up from the bottom, and the pins become useless. They then have to be removed, but the patient can by that time easily dispense with the assistance previously afforded by their presence.

(iii.) *Ridges*.—There are two kinds of ridges that are of use, both are made by cutting grooves in the plaster model. One is made by cutting a groove outside the alveolar ridge, this I have never tried, but have been told it is of use. The other is made by cutting a groove within the palate of the model, midway between the intermaxillary suture and alveolar ridge, where the mucous membrane is soft and yielding. They must be cut at right angles to the surface, and are then extremely useful. Their free edge should be left quite sharp.

(iv.) *Suction*.—This is the best of all forces for retaining dentures. A perfect fit is the *sine qua non*; consequently plaster impressions and vulcanite dentures, baked on the models, give the best results.

Many devices for aiding suction are in vogue, *i.e.* :—

(a) Roughening the surface of the plate, this is distinctly of use sometimes.

(b) Suction chamber: a depressed area on the surface of a plate, which is supposed to induce a tendency to a vacuum. But after a short time, the mucous membrane hypertrophies sufficiently to fill the space, and the tendency to a vacuum is lost.

(c) Suction disc: a rubber sucker fastened to the plate with a rivet, it is a perfectly useless contrivance.

(d) Artificial rugæ, or accentuation of existing rugæ : is a most excellent way of creating, and taking full advantage of, inequalities of the palate that ought naturally to exist. It is a method specially useful in gold work, adding moreover to the strength, comfort, and appearance of the finished plate.

(v.) *Springs*.—Are regarded by some as curiosities of the past ; but for all that they are quite indispensable at times, and are our sheet anchor in the day of trouble. Therefore it is well to be familiar with the possibilities of well adjusted springs.

Now, gentlemen, I have finished. I hope many of you will be kind enough to take part in the discussion, so that all may enjoy the advantage of hearing your several opinions. Pray do not hesitate to criticise freely what I have said, for I know that each individual has his own pet ways and ideas. I have tried my best to tell you some of my methods, so I hope you will in your turn tell me some of yours.

FIRST PRESIDENTIAL ADDRESS TO THE NORTH OF ENGLAND ODONTOLOGICAL SOCIETY.

By J. A. FOTHERGILL, M.R.C.S., L.D.S., Eng., D.D.S., Penn., Weitz.

GENTLEMEN,—My first duty to-night is to congratulate you on having established the first Dental Society in the English Counties north of the Tees.

As you all know, a new-born infant, even though it may have come into the world with a sturdy constitution, is a tender object, and much care and patience are required to rear it up into independent life. But I trust that the originators of the North of England Odontological Society will not be found lacking in the necessary enthusiasm and diligence.

In this age of organization amongst all manner of men, it is hardly necessary to point out the advantage of uniting together for a common object. But as we have so long neglected to avail ourselves of these advantages, I may perhaps be excused if I mention some which apply to our special case.

First there are the advantages of a purely social nature. How often it happens that our opinion of a man, of whom we have only

an outside general knowledge, changes when we come to know him personally, and the man whom we have thought unattractive, proves on acquaintance to be a really agreeable fellow. I am sure that we all find it more pleasant to live on terms of amity and good-will with our *confrères* than merely to regard them as men in the street.

Again, it must sometimes happen, that the clients of a fellow-practitioner will fall into our hands, and the acquaintanceship formed by means of such societies, will remove the temptation to take any unfair advantage which circumstances may place in our way.

A man who does not associate with his fellows is apt to become rusty, to lose interest in the scientific aspects of his work, and merely look on dentistry as a means of making money. Or, if his enthusiasm is too great for this to happen, and his abilities are above the average, there is the danger of isolation breeding conceit. On the contrary, there is no such stimulus as meeting with our professional brethren. We get new ideas, and are made to think about what we are doing, and a healthy spirit of emulation is fostered, which makes a man strive to do his work in the best manner of which he is capable.

My second duty is of a personal nature, *viz.*, to thank you very heartily for the position in which you have placed me. I am exceedingly sorry that the condition of Mr. Hele's health prevented him from accepting the office of president. And whilst regretting that it has not fallen into abler and more experienced hands than my own, I can only say that I will do my best, and trust to your kind indulgence to overlook my deficiencies.

It is usual on these occasions to make some review of what we term dental politics, but as I am not able to say anything new, my remarks shall be very brief. Many men seem to take a pessimistic view of our present situation, but looking back on the twenty-four years which have passed since I became a dental student I think there is abundant cause for congratulation. The Dental Act of 1878 defined and protected the title of dentist, and limited its assumption in future to those who have passed through a regular course of training and examination. Having attained this position, it remained with us to work out our own salvation. This evolution is going on fast. We have three important dental schools in the Metropolis, one in Edinburgh, and another in Dublin, and a number of active schools in the provinces.

Already in the first half of the present year sixty licenses in dental surgery have been granted by the examining bodies. It appears to me that we must look to education and organization, rather than to prosecutions and Acts of Parliament for the advancement of the profession. The intelligent public has now the means of distinguishing between the legitimate and the illegitimate practitioner, and that is all it wants, or would be likely to sanction at the present time.

I am not deprecating the strict enforcement of the existing law. On the contrary, I think our society may do valuable work in seeing that the dental register is correct, as far as our district is concerned, and in obtaining information of infringements of the Dental Act.

It seems desirable, however, that legal and political action should be under the guidance of a body representing the whole profession in the United Kingdom, and I think we must all allow that the body most nearly occupying that position is the British Dental Association. I certainly hope that before long a strong branch of that association may be formed in the North of England.

There are one or two other subjects on which I should like to make a few remarks.

One of the features of the medical profession, which gives it a high place in the public respect, is the large amount of work done by its members without any monetary remuneration. Although dentistry does not deal with matters involving life and death, it may safely be said that in no other branch of surgery can so much human suffering be relieved at so small a cost to the benevolent public. A city of the size and importance of Newcastle ought to be able to support a hospital where conservative dentistry could be carried out. An objection frequently made to dental hospitals and medical charities in general is that the struggling practitioner is robbed of fees which would otherwise fall to his share. I do not think there is much danger of this happening under judicious management; but, on the contrary, people who take no care of their teeth at present would be educated to do so, and in the long run the number of paying patients would be increased. And if a dental hospital were established, why should not a dental school follow? There is in the Medical College of the University of Durham, excellent provision for the medical portion of the dental student's education, and a prominent member of the council stated on a recent occasion that a well-supported movement, having for its

object the establishment of a dental department, would receive the favourable consideration of the authorities of the College. In this connection the importance of the suggestion that this society should form a museum is increased. It might become the nucleus of a collection very useful for teaching purposes. I think that many of us, who possess specimens of pathological interest, would be glad to present them to a museum where they would be taken care of, and be available for purposes of comparison and study. These questions naturally concern the Newcastle members most intimately, but as we regard this city as our northern metropolis, we all have an interest in the matter, and hope to see it become a centre of dental activity.

The mechanical training of dental students has been a good deal discussed of late and the pupilage system has come in for severe criticism. No doubt there is much to be said in favour of an institution specially devoted to the teaching of dental mechanics, and supplied with a well equipped laboratory and staff of teachers. On the other hand, the pupilage system, if properly carried out, has many advantages, and at any rate a portion of the three years devoted to mechanical training may usefully be spent in this way. The student, in commencing his hospital course, is embarrassed by the multiplicity of his studies, and finds difficulty in giving sufficient time to hospital practice. But if, whilst a pupil, he has been thoroughly grounded in chemistry and metallurgy he will find it greatly to his advantage. In most towns it is now possible for the pupil to obtain efficient instruction in these subjects by attending classes for which he could easily spare time. In such towns as Newcastle he might also make acquaintance with biology, and he would be the gainer, not only in knowledge, but in habits of industry.

I will now bring these rambling remarks to a close with the hope that we may have a successful series of meetings during the coming winter.

Reports of Societies.

THE ODONTOLOGICAL SOCIETY OF GREAT BRITAIN.

THE ORDINARY MONTHLY MEETING was held on the 5th ultimo, the President, Mr. F. CANTON, in the Chair. The minutes of the

previous having been read and confirmed, the PRESIDENT announced that Messrs. R. Woodcock W. R. Wood, and C. S. Hull, had signed the obligation forms, and had been admitted Members of the Society. Messrs. P. Harrison, J. W. Shilcock, W. F. Mellersh, J. D. Whittles, and Mr. Rowe, signed the obligation book, and were also admitted. Messrs. F. E. Davar, of Bombay, and J. W. Pare, London, were proposed for membership.

The LIBRARIAN (Mr. W. A. Maggs) reported that, since the last meeting, the following books had been received :—Tomes's "Dental Anatomy," 4th edition; Heath's "Injuries and Diseases of the Jaws," 4th edition; "Guy's Report, 1893"; the "Report of the Smithsonian Institute, 1892," and the usual exchanges. He took the opportunity of mentioning that during the winter months, the Library would be open on Monday, Wednesday and Friday evenings.

The CURATOR (Mr. Storer Bennett) announced that several specimens had been received during the recess. From Mr. Frank Merson, of South Molton, they had received :—(1) An upper incisor, removed from the mouth of a young man aged 19, showing considerable absorption of the root, leaving it only one quarter of an inch in length. (2.) A lower wisdom tooth removed from the mouth of a lady aged 40. The tooth caused great deal of pain for some years, and ultimately, after considerable difficulty, it was removed, without any injury resulting to the molar in front, though, as far as Mr. Bennett was able to make out, the tooth had not erupted. (3.) A specimen of extreme interest, showing the enormous amount of damage animals, whose teeth were of persistent growth, might suffer from an injury. It was the skull of a hare, and showed that the mandible had been fractured, evidently long prior to death, vertically between the second and third molars. The result was that the antagonism of the teeth was imperfect, and the right lower incisor had grown to double the length of the upper one. The two upper incisors had not been very much deflected, but the left side of the right incisor had entered the cheek, and although the whole of the soft tissue had not been removed, it had probably pierced the bone. The molars in the mandible on the right side were very abnormally placed, in consequence of the lack of normal attrition after the accident. The jaw could only be slid from right to left, the result being that the first molar had been diverted backwards, the second molar passed directly upwards in the normal position, and the

third and fourth molars were directed forward, the upper molars biting upon the distal and lingual surfaces of the teeth. There was a distinct interlacing of the teeth in a most remarkable manner. The normal height of the teeth would be from one-sixteenth to one-eighth of an inch, but these lower molars on the right side were erupted to the extent of three-eighths of an inch. The rims of the molars were worn in such a way as to evidently indicate that the mastication was neither an up and down, nor an ordinary transverse movement, but simply a sliding of the molars from left to right, for the outer sides of the upper molars were worn away, and the inner sides were left long, whereas on the left side the reverse was the case. It would be seen that the development of bone on the right side of the jaw was very much stunted compared with the left. Mr. Pidgeon, a student of the Dental Hospital of London, had presented a left upper central incisor with a very short root. In clearing out the pulp canal preparatory to crowning, he came upon sensitive vascular material, evidently situated at the end of a very short canal. He very wisely decided to extract the tooth, and then found that the root was only about one quarter of an inch in length. Mr. Bowtell, a former student of the hospital, had sent a skull of a Maori. The teeth were very much worn by attrition, many being absent altogether. It would be noticed that the teeth in front were very much worn in consequence of the loss of the back teeth. The right half of the mandible of a cat had been presented by a present student of the Dental Hospital, which showed, as beautifully as any specimen Mr. Bennett had ever met with, the formation of the vaginal sheath enclosing a sequestrum. There was a very large sequestrum in the molar region of the jaw, with an extremely vascular porous bone around it. He had brought down from the museum a preparation made some years ago, to show the dentition of a cat. An examination of the two specimens side by side, would enable them to appreciate more readily the enormous amount of distension that the bone had undergone. Mr. Morton Smale had sent three mandibles, together with a long and interesting description; these they had only just received, and as there were several points of interest about them, he (Mr. Bennett) would ask permission to reserve any comments to the next meeting.

The PRESIDENT regretted to have to report the death of Mr. Ibbetson, who was president in 1867. They had that evening

departed from their usual course. There was no paper, and instead of filling up the evening with Casual Communications, they thought it might be agreeable to members to hold a kind of conversational evening, more especially as it was their first meeting after the holidays. Before closing the more formal proceedings, he would ask them to allow him to thank those gentlemen who had kindly brought forward microscopical specimens, and also those who had made such highly interesting donations to the museum. The meeting then resolved itself into conversational groups.

STUDENTS' SOCIETY, DENTAL HOSPITAL OF LONDON.

ORDINARY GENERAL MEETING, held Monday, November 12th, the President, A. E. CLAYTON-WOODHOUSE, E-q., in the Chair.

The minutes of the previous Meeting were read and confirmed.

Mr. Malone signed the Obligation Book, and was admitted a member by the President.

On Casual Communications being called for Mr. DAY showed the model of an upper jaw in which the canine was erupting horizontally in the palate. A plate had been made to the mouth the front roots having been removed but after being in place for a short time it was found to rock over a hard surface in the palate. This was eased from time to time and eventually the crown of the canine tooth appeared and was removed with some difficulty owing to its long and twisted root.

Mr. D. P. GABELL said that some short time ago he had presented the Society with a photograph of a girl having a supernumerary auricle, and a mouth extending an inch more than normal on to her left cheek. The girl had since been very successfully operated on by Mr. Bland Sutton, who removed the auricle and sewed up the redundant part of the mouth. He now wished to present the Society with a photograph of the same girl after the operation showing a marked improvement in her mouth, ear, and whole expression, the latter possibly due to the moral effect of the former.

Mr. MOSELEY showed the mandible about which he spoke at the last meeting. It should have been stated that both third bicuspid were in position instead of only one of them.

The PRESIDENT then called upon Mr. W. S. Nowell for his paper. (See p. 534.)

Mr. RUPERT WHEATLEY, after thanking Mr. Nowell for his paper, said he should like to ask Mr. Nowell what material he advocated using for the making of temporary plates after the extraction of many roots. He himself much preferred vulcanite to metal. The making of wax pieces for bites upon the temporary models, a method so often seen, was in his opinion to be deprecated. The casting of plaster bites, owing to contraction, was not as good a practice as using Stent's. Mr. Nowell had advocated the striking up of plates on the knees, he did not see why any one should run the risk of developing corns or bursæ in their knees. He liked to strike up collars with the plates, as then there was no need to cut away the plates afterwards.

Mr. PASCALL TAYLOR said that Mr. Matheson had recently introduced to his notice some specially made gutta percha for impression taking, by using which you obtained a much sharper impression of any undercuts there might be. The practice of taking bites with wax pieces made upon temporary models although not approved of by Mr. Wheatley was adopted to save the patient's time and it gave very good results.

Mr. NORMAN BENNETT thanked Mr. Nowell for his paper, and said that he preferred to use, when making temporary metal plates for bites, etc., three or more thin tin plates in place of the Britannia metal one advocated. You were able to strike them up with a stent counter-die and they were much easier to take out when the case was flaked. As regards the cutting out of patterns, and smoothing them out from without inwards you were very apt to crumple it in the middle and then the gold was often too small. In the striking up of gold plates you desired to get the material conveyed from the alveolus to the palate, and unless time was taken in striking it up, and the plate frequently annealed, the particles of the gold became separated, and the plate was either split or very much weakened. From personal experience he could say that suction chambers and discs were of no use.

Mr. GABELL thanked Mr. Nowell for several suggestions that were new to him, and stated that he would like to emphasize Mr. Nowell's remark as to the necessity of feeling a patient's mouth over after taking a plaster impression. He should like to know why

the extraction of all the molar stumps was advocated and yet the bicuspid saved? Both were occasionally useful to prevent sinking of a plate. Mr. Matheson was the only surgeon at the Dental Hospital who advocated gutta percha for taking impressions. In setting up teeth for edentulous cases the blocks used for a bite were a very useful guide if well made in the first place, and in an interlocking bite which had a better masticating power could be set up with a Bonwill articulator, so as not to shift either plate when in use. He thought celluloid much better for making temporary plates as with hot instruments it could be remoulded to a new model in a very short time well enough to give the patient much greater comfort.

Mr. DAY said that he had found suction chambers very useful in some cases. In casting bites in plaster he always with a pair of compasses made several arcs on the models, and thus, even if the plaster did alter its shape, you were able to readjust it. In fitting bands he thought that the essential was for them to fit well at each edge, not at one edge and the centre, whilst at the lower edge it did not touch the tooth.

Mr. PAGETT said the use of gums, resins, as a varnish when casting plaster impressions was liable to dull the impression. He thought that contour work ought to be more generally used and also polishing plates, the latter very much diminished the work of polishing. In striking up bar lowers he had found, in those cases where there was a tendency for them to slip down, that it was a good plan to bend the lead over the gold when it had been roughly malleted into position.

Mr. E. LLOYD-WILLIAMS, whilst congratulating the reader, said that he felt obliged to disagree with the scope of the paper, as, if it had been confined to one subject the reader would have been able to give, instead of a scanty survey of mechanical work, a very practicable paper. With regard to the extraction of roots he held it as a good general rule, when in doubt, to extract everything, it being a very easy matter to restore the contour of the face. In taking plaster impressions of those teeth where the gums have receded, leaving V-shaped space at the neck, it was a good plan to pack in bibulous paper.

If the rugæ are not well marked in the Britannia metal, it was a good plan to paint wax over them on the model, or else to deepen

them and smooth them off in the plug when using the three part flask.

In a vulcanite plate the strength was represented by the thinnest part, and as it was impossible, in his opinion, to make and polish a vulcanite case without thinning it in some places, it was best in order to enable the vulcanite to stand varying pressures, to use a metal strengthener, and the best for that purpose was the thin perforated gold. As regards flasking he always advocated the three part flask, although he was quite aware that a clever mechanic would get on admirably, and have very good results with the ordinary methods, yet every student was not a good mechanic, and therefore for the ordinary man, with ordinary care, the three part flask gave the best results.

Mr. CARL SCHELLING said that to obtain hard models it was much the best plan to take off the impression material without the aid of water for stent or wax. Fletcher's oven in which the heat was thrown down upon the model, was the best. The three part flask was in his opinion exactly the same thing as the upside down method, with one joint, and was one step towards raising the bite. The use of the scraper was done away with when a tin plate was used as polishing plate. In certain cases, as for instance, where the four incisors had been lost, and the molars and bicuspid's inclined towards the middle line of the mouth, plaster was the only material that was of any use for taking impressions, and a vulcanite plate which sprung into position was the most suitable in his opinion. Roots that were firm and hard he always left in the mouth whether they were incisors or molars.

Mr. NOWELL then replied, and a vote of thanks having been accorded to him, and to those gentlemen who had brought forward Casual Communications, the President announced that the next meeting would take place on December 12th, when Mr. Gartrell will read a paper on "Continuous Gum Work."

DR. BLACKMAN, of Portsmouth, places on record in the pages of the B.D.A. Journal a case having been swallowed and safely passed per anum. The plate was an old broken one and carried three teeth and a band.

THE DENTAL RECORD, LONDON: DEC. 1, 1894.

ANOTHER "READING" OF AN OLD FRIEND.

OUR old friend, Nasmyth's Membrane, seems to find itself again on troubled waters and to have re-embarked on a fresh sea of doubt. Mr. F. T. Paul, the lecturer on Dental Anatomy, in connection with the Liverpool school, claims to have evidence that it is not of homogenous structure but is really of an epithelial nature. The markings seen on its under surface, which have been held by many to be impressions formed in it by the outer ends of the enamel prisms, appear to him to be really the outlines of epithelial cells, the nucleus of which he, too, claims to have made out. There, also, appears to be a layer of tissue of an elastic nature, like the fenestrated membrane of Henle which lies between these epithelial cells and the enamel. If further observation confirms the epithelial nature of this structure, the idea that it is a thin layer of cementum, for which view the balance of evidence seemed in favour, will no longer be tenable. Mr. Paul has fallen back on the idea, that the epithelial cells may be the external cells of the enamel organ whilst the membrane, he thinks, might possibly be a final product of the enamel cell. We are bound to look on these observations with doubt till they obtain that corroboration by others, which Mr. Paul asks for, but we would say the idea that the enamel cells should form a membrane resembling Henle's, as a sort of expiring effort, does not commend itself to our common sense, more especially as between the external and internal cells of the enamel organ we have other structures, the so-called stellate reticulum and the stratum intermedium, vestiges of which it would be equally as plausible to expect to remain as for the external epithelium to be persistent. For the whole of

Mr. Paul's arguments and for his methods of research we would refer our readers to the original paper reprinted from our contemporary the *British Journal of Dental Science*. We, however, welcome this new view of an old subject as one, which we may, not unnaturally, expect to lead men towards undertaking the work of research, who, otherwise, might not do so. There is no doubt we are all too apt to look on scientific statements as facts beyond dispute, and so be lulled into a dreamy state of acquiescence, which is neither good for ourselves nor for the progress of knowledge.

News and Notes.

MR. F. E. DAVIES, Dublin, having passed the necessary examination, has been admitted a licentiate in Dental Surgery of the Royal College of Surgeons in Ireland.

WE are glad to note that Mr. Coleridge-Roberts has been elected Sheriff of Lichfield.

MR. MORTON SMALE has been re-elected, for a further period, Examiner at the Royal College of Surgeons, England.

WE understand that the Medical Council have appointed Mr. Charles F. Tomes, F.R.S., Visiting Inspector of the various Examinations held in Dental Surgery in the United Kingdom. At the end of the year he will send in a report.

THE Glasgow Dental Students' Society was opened November 7th, by an address from the Hon. President J. R. Brownlie, Esq., who, after a few words of thanks to the students for electing him to be their Hon. President, and congratulating them on the success of their society, gave an interesting paper on childrens' teeth, and the fillings to be employed in treating these. In conclusion he urged upon the students the necessity of gaining the confidence of their young patients.

Invention says that an American firm is supplying mouth blowpipes of a somewhat improved description. Each pipe carries a short branch tube with an india-rubber bulb attached, and the bulb being distendable, is said, in some degree to replace the automatic action of the cheeks in equalising the pressure of the air draft. This might prove of use to those, and there are such, who cannot acquire the cheek action requisite to keeping up the continuous blast.

A BLOTTING-PAD is being introduced, *Invention* hears, made of bibulous stone that is said to absorb ink more readily than any blotting paper in use. It is formed by compressing the sediment deposited by certain hot springs, which, having accumulated for ages, "is available in inexhaustible quantities." It is highly porous, and will, it is said, take up a surprising quantity of ink, requiring only occasionally scraping with a knife to keep it clean and ready for use.

LOUIS JACK, of Philadelphia, gives the following classification of cases of exposure, in the *International Journal*:—(a) Where no previous observable disturbances can be elicited. (b) Where the tooth has been impressed only by the application of low temperature. (c) Where, in addition, reflected pain in related parts has been observed. (d) Where the tooth has become subjected to impressions by heat. (e) Where continued objective disturbances appear, such as soreness to touch, or local pain of spontaneous character or pulsations. As the result of long experience, he considers classes *a*, *b*, and *c* entirely admissible to treatment by capping, and also, problematically, class *d*, if taken early. Where there is a difficulty in placing the cap in position, he coats its converse side with yellow wax, this enables him to carry the cap into position. He fixes the cap in its position by allowing a little chloro-percha to flow over it.

A TEMPORARY gutta-percha filling material is made by Mr. Arthur Stoddard, of Boston, as follows:—Take Knapp's sheet gutta-percha, cut into strips, and leave in equal parts of oil of cajuput and chloroform for two or three days. Warm till it is soft,

and work in plaster of Paris till it is of the consistency of putty. Manipulate it well, and roll into strips, leaving there till the solvents have evaporated.

THE first of an intended series of smoking concerts in connection with the Edinburgh Dental Students' Society, was held on November the 9th, in the Imperial Hotel, the Chairman being Mr. W. Bowman Macleod, then Dr. William Craig, the Hon. President of the Society, and afterwards Mr. Herbert B. Ezard, L.D.S. The Chairman congratulated the students in having as directors of their hospital the elected Lord Provost of that day, and the new Baillie, Councillor Kinloch Anderson. Hitherto the "Socials" have always been a pronounced success, and the present was no exception, the society having quite an array of lay talent, though the students contributed the larger portion of the programme. The Society's Ordinary Meeting was held on November 5th, when Dr. Craig gave an inaugural address, and Mr. J. Morris Stewart read a paper on "The Hygiene of the Mouth."

AN inquest was held on November 14th, at Liverpool, on the body of the wife of a prominent citizen, who died while under the influence of chloroform. It had been administered to her on several occasions with perfect success. She went by appointment to Mr. Osborn, and Mr. Larkin administered the anæsthetic. Until this case, no fatal case had happened from anæsthetics in their personal experience. The patient had abstained from food, and had taken the chloroform well, after some struggling, when suddenly her face was observed to be slightly livid; the administration of the chloroform had been stopped, and Mr. Larkin had considered that she was ready for Mr. Osborn to begin. Every effort was made by both gentlemen, aided by Mr. Osborn, jun., and Dr. Briggs, to restore suspended animation, which, as the breathing continued, they hoped might prove successful, but though these efforts were continued for three hours they were unavailing. The jury returned a verdict of "Death from misadventure," adding that the chloroform had been skilfully administered. The post-mortem examination revealed some slight affection of one kidney, which had not been previously suspected, but the heart and all the other organs were healthy.

The following Tables are taken from, and have been drawn up by the *Lancet*:—

DIPLOMATES ADMITTED TO THE COLLEGE OF SURGEONS, ENGLAND,
FROM 1887 TO 1894.

	1887	1888	1889	1890	1891	1892	1893	1894
Fellows	1,116	1,122	1,138	1,153	1,111	1,110	1,122	1,144
Members	17,377	17,027	17,170	17,345	16,622	16,771	17,043	16,733
Licentiates in Midwifery	957	890	866	800	737	704	695	659
Licentiates in Dental Surgery	617	646	676	703	745	793	846	927
Holder of Diploma in Public Health	...	6	29	45	86	126	163	189

Membership.	Proportion of Rejections. 1894	Membership.	Proportion of Rejections. 1894
FIRST EXAMINATION.		THIRD EXAMINATION.	
Elementary Anatomy ...	1 in 4·73	Surgery	1 in 2·34
.. Physiology ...	1 in 6 nearly	FELLOWSHIP.	
.. Biology ...	1 in 3·05	1. Anatomy & Physiology	1 in 1·63
Chemistry	1 in 2·25	2. Pass Examination ...	1 in 2·2
Materia Medica ...	1 in 3·11	DENTAL SURGERY ...	1 in 3·1
Practical Pharmacy... ..	1 in 3·4	PUBLIC HEALTH.	
SECOND EXAMINATION.		Part I.	2 in 2·55
Anatomy	1 in 2·58	Part II.	1 in 2·18
Physiology... ..	1 in 2·40		

Abstracts and Selections.

NASMYTH'S MEMBRANE.*

By F. T. PAUL, F.R.C.S.

GENTLEMEN,—Having been somewhat earnestly requested by your President to furnish something in the way of a paper for the first meeting of the Society this session, I have endeavoured in the

*Read before the Liverpool Dental Students' Society.

short time which has elapsed to put together a few observations, which I hope may prove interesting to you in connection with that department of your science to which I am attached, namely Dental Anatomy. Permit me, however, to lay stress upon the fact that I am not at the present moment prepared with any fully completed work, so that what I have to say in response to your President's invitation will relate to matters which I am endeavouring to work out, and to which I shall hope to add in some future communication. I have selected as the chief item for this evening's discussion the origin and structure of Nasmyth's membrane.

Nasmyth's membrane, I need not remind you, is a delicate horny pellicle which can be removed from the surface of the enamel of young teeth by the action of acids. The principal characters of this structure are:—(1) That it is exceedingly thin. (2) That it presents a reticulated pattern under the microscope, with or without the help of nitrate of silver. (3) That it is of a horny nature as is shown by its indestructibility by both acids and alkalis, and by its giving off when burnt the same smell as burnt feathers.

The chief views as to the nature of this structure as set forth in Tome's Dental Anatomy are familiar to you all. They are shortly:

- (1) That it is an exceeding thin layer of cementum (Tomes).
- (2) That it is a final product of the enamel cells (Kölliker).
- (3) That it is derived from the external enamel epithelium (Waldeyer).

The cementum theory so ably advocated by Tomes has always seemed to me to require further confirmation, I therefore set myself to work at Nasmyth's membrane, and the following are the results obtained.

Method employed: Young unworn teeth, human, monkey, and sheep, were placed in 2 per cent. solution of bichromate of ammonia for one month, then after washing transferred to two or three changes of spirit, and finally placed for decalcification in a 5 per cent. mixture of nitric acid and weak spirit. As soon as the enamel was softened, the tooth was placed in a watch glass full of water, and the membrane torn from its surface with needles. It was then stained in eosin, and mounted in Farrant's medium.

Specimens obtained in this way showed the reticulated pattern at once and without any treatment with nitrate of silver. Now it

has been assumed that this appearance might be due to the impress of the terminal ends of the enamel fibres ; but against such a suggestion is the fact that the pattern is at least ten times too large for the enamel prisms. Measurements, however, are unnecessary to prove that the pattern is produced by the outline of epithelial cells, since in many of them the nuclei are quite as visible as the margins. I think it is only necessary to look at a specimen obtained from the canine of a young adult to accept the fact that a layer of epithelial cells enters into the composition of Nasmyth's membrane, whatever difficulties there may be in accepting this view.

Epithelial cells, however, do not apparently account for the whole structure, for the shreds of membrane removed curl up like the fenestrated membrane of Henle, when torn from the inner coat of an artery, and the curling is seen in some specimens to be due to the presence of a thin structureless membrane on which the epithelial cells are placed. So thin and so clear is it that I only ascertained with great care that it was placed between the cell layer and the enamel. At first it seemed probable that this transparent membrane was of mesoblastic origin, and corresponded to an original basement membrane placed between the enamel organ and the tissues of the gum. If so, of course I should have met with it external to the epithelial layer, whereas it was between the epithelium and the enamel prisms, and must therefore be a product of the enamel organ itself, perhaps Kölliker's final product of the enamel cells.

I make out then that the structure of Nasmyth's membrane consists in a layer of polygonal, flattened epithelium, measuring about 1-2000th inch broad, and up to 1-1000th inch long, placed upon a thin, structureless, elastic membrane. When a tooth has been decalcified in a strong acid aqueous solution, like Hopewell Smith's, I have easily been able to obtain the structureless lamina, but not the epithelial layer, and it appears probable that different methods of preparations are chiefly concerned in the diversity of views expressed as to its structure.

The next point to determine was the origin of the membrane. As it is well known an immature tooth whilst still beneath the gum is contained within a tough fibrous sac, the dental sac or follicle. I hardened some teeth from the sheep and the monkey in this

condition. On dissecting them it appears that at a certain stage the crown of the tooth was quite free inside the sac, but that at a slightly later stage the sac adhered to the tooth although it could be easily stripped from it. At the neck of the tooth the sac was continuous with the fibrous membrane from which the cementum and alveolo-dental membrane are developed.

On cutting sections of the dental sac in its free condition, I found that it was composed of a thick vascular fibrous coat, lined internally with a thin layer of epithelial cells arranged after the manner of the external enamel epithelium, which it undoubtedly was. On subsequently examining the adherent sacs I found that the epithelial lining was wanting, and that the fibrous layer only was present. Under these circumstances it was fair to assume that the external enamel epithelium had come in contact with, and adherent to the surface of the enamel, an assumption which was proved to be correct, since by firm scraping of the surface of this enamel under water I was able without the help of acids to remove shreds of membrane coated with a layer of epithelial cells, the nuclei of which were distinctly visible.

Now if these observations are correct, and of course they need corroboration—I shall endeavour to corroborate them myself and I shall be much pleased if some of you will do the same—if, I say, they prove to be correct, it may be considered an established fact that Nasmyth's membrane is an epithelial structure and is derived from the external enamel epithelium. But how about the observations of others? Theories may of course be wrong; but careful observations by good men it is best to assume are correct, and when Tomes says that he finds encapsuled bone lacunæ in connection with Nasmyth's membrane in pits in the enamel, I accept his observation as a fact, though I dispute the theory he builds upon it. Tomes bases his view that Nasmyth's membrane is a thin layer of cementum chiefly upon the following observations.—1. In several mammals it is normal for the enamel of the crown to be covered with a layer of cementum. 2. It is not uncommon to find in human teeth that the cementum overlaps the enamel at the neck. 3. Nasmyth's membrane when loosened by acids comes away attached to the thin layer of cementum at the neck. 4. Thin layers of cementum presents a structureless appearance under the microscope. 5. When Nasmyth's membrane appears to fill up a pit in the enamel bone

lacunæ may be met with in it. This sounds like a strong case for the cementum theory. Still another interpretation is quite possible, and indeed equally reasonable. The only observations of Tomes relating to the membrane itself are the occasional presence of lacunæ in it, and its connection with the cementum at the neck of the tooth. I admit the correctness of these observations, though I have not been so fortunate as to find the lacunæ myself. At the same time I assert that the definite presence of an epithelial layer is indisputable, and if Tomes's observations are correct they must be accounted for consistently with this fact, which as it seems to me is not at all difficult. Every reason urged by Tomes in favour of the cementum theory is equally in favour of the possible occurrence of cementum outside a true Nasmyth's membrane. The cementum organ of the herbivora is the connective tissue wall of the dental follicle, whilst as I have endeavoured to show the epithelial lining of the follicle forms Nasmyth's membrane. Both layers are present in human as well as herbivorous teeth. Hence it seems quite reasonable to assume that, under the exceptional circumstances of a deep pit in the enamel, it should be filled, not by an overgrowth of this thin horny pellicle, but by connective tissue derived from the outer wall of the follicle, which might then undergo in the human subject that change which is constant in many animals and in other parts of human teeth, namely conversion into bone. Such a view would reconcile the apparent discrepancies between all observers. A fresh observation is however wanted to complete the case; it is the discovery of a horny or calcified, flattened epithelium between the enamel and cementum in herbivorous teeth. Up to the present I have only had time to make one attempt to discover this. I split some properly prepared sheep's teeth and partly decalcified them; then deep down between the cusps I removed the cementum and scraped the surface of the enamel. Among the scrapings was one piece of a distinctly epithelial nature. This would be the piece of evidence wanted if only one could be positive that no error could possibly have crept in; but though I believe that I followed this particle from the inner enamel to the micro slide, it is no doubt possible that it was liberated from some other part of the tooth. The observation therefore awaits corroboration. My belief is that in all compound teeth consisting of layers of dentine, enamel, and cementum, there constantly exists between the two latter a remnant of the

external enamel epithelium in the form of Nasmyth's membrane, and I think it should be demonstrable, because for instance in the germs of sheep's teeth, the cells of the external enamel epithelium are large, numerous, and distinct, and by no means look as though they were functionless and likely to disappear, leaving no trace of their existence.

In regard to the other observation of Tomes referring to the connection of Nasmyth's membrane with the cementum at the neck of the tooth, it is easily explained in view of the origin of the former from the external enamel epithelium. In such case it, like the enamel, would be slightly overlapped by the cementum, and when the two are loosened by acids it is only natural that they should come away together.

Now as regards Kölliker's view that this structure is a final product of the enamel cell. It seems to me that this view also is not at all inconsistent with my results. As I have pointed out, there is a clear, structureless lamina to which the epithelial cells adhere, and which is placed between them and the enamel. Is it not possible that when the external enamel epithelium becomes adherent to the enamel, the adhesion is affected through some final product from the enamel cells themselves. If so, Kölliker's observations are correct so far as they go, but are not complete.

I have now, gentleman, urged all that I have to say in favour of the view that Nasmyth's membrane is chiefly an epithelial structure derived from the external enamel epithelium. I believe it is present in most if not all teeth, though it may often be very difficult if not impossible to demonstrate it. The points which I have raised are far from settled. Indeed, I am sure that much patient and skilful work will be needed before all doubts are solved, and the comparative histology of this subject has been satisfactorily worked out. It may seem to you a very small matter upon which to spend so much time and energy. But are you sure that it is a small matter? Is this structure to be regarded as functionless? It is chemically far more resistant than the hard enamel itself. May it not protect the enamel from those chemical changes constantly at work in the mouth? It is true that on exposed surfaces it readily wears away, but in pits and hollows, and over the surfaces between the teeth it would not be subjected to this wear and tear, and in these, the most vulnerable points, it would remain and may possibly constitute a valuable protecting agent. To carry the suggestions still further.

Is it not possible that some of the friable, perishable enamel so prone to early decay may be enamel devoid of Nasmyth's membrane? If derived as I think from the external enamel epithelium that epithelium is directly continuous with the surface of the gums, and may be supposed to readily participate in any inflammatory changes effecting them. Or it may be damaged or destroyed by too early lancing of the gums and so opening the dental follicle before it has become adherent to the surface of the enamel. Under such conditions Nasmyth's membrane might be absent, and it seems reasonable to suppose that enamel devoid of its protection could hardly compete with that which is shielded by it. Such views are I am aware of a very speculative nature, but I suggest them to you because I wish to gain the interest of clinicians as well as biologists, and to encourage you all if I can to join with me in trying to work out as far as we are able the origin, structure, and functions of Nasmyth's membrane.

Before concluding, I should like to say a word or two to the student members of this Society on the general subject of dental histology. I wish to remind them how very much there is yet to be done in this branch of dental science, and to encourage them, if possible, to take some share in it. Even in respect of the little detail of structure we have been considering this evening, there remains a great deal to be discovered, and yet how small an item it is compared with any of the more important tissues. Modern methods have revolutionised this department of study. Under their influence the whole field of dental histology is re-opened, and the entire animal kingdom awaits fresh investigation. Just now a great impetus has been given to this study. An entirely new method has been introduced by which the soft tissues after fixing and staining are petrified and ground down together with the hard structures. This method offers, though with great labour and many disappointments, preparations which previously were impossible. I am fortunate in being able to show you a portfolio of microphotographs just brought out by Drs. Röse, of Freiburg, and Gysi, of Zurich*, which are very beautiful and of great scientific interest; among them you will find

* The portfolio, containing 12 large microphotos and 12 engravings from them, can be obtained from Dr. Gysi, Börsenstrasse, 14, Zurich, at a cost of about 21s.

examples of sections prepared by this petrifying process. I have made some trials of the method, and whilst recognizing that it has certain special advantages over every other process, I am of opinion that the best line of research for general purposes is still by careful decalcification of the hard tissues, and I would direct your energies rather towards the perfecting of these methods than to too much loss of time over the petrifying process. Mr. Hopewell Smith, of Boston, who seems to be an indefatigable worker, and who has published for students some admirable papers on dental histology, has devised a process for rapidly decalcifying bone and dentine which yields excellent results. He has been so good as to send me an example of his work, which I have much pleasure in submitting to your inspection. It proves that, notwithstanding the use of a strong acid solution, the delicate tissues of the pulp may still be remarkably well preserved. Details of Mr. Hopewell Smith's method are given in the DENTAL RECORD for September, 1894. If you undertake any research on this subject I would advise you to spare no pains in obtaining primarily a perfect fixation of the soft tissues, otherwise they are very liable to shrink and change. The bichromates, though possessing the great advantages of rapid penetration and easy subsequent staining, are not I fear to be altogether relied upon. And I would rather advise you to experiment with Flemming's solution of chromic, osmic, and acetic acids: or Hermann's fluid of Platinic chloride, with osmic, and acetic acids: or chromic acid and spirit in the dark, as being more perfect fixative agents, and likely to yield better results. I feel sure that it is in the direction of decalcification that we must work, and I would like therefore to encourage you to take up this subject. But the scope for original work in dental histology is simply unlimited, and I shall therefore hope to learn that the session we are inaugurating to night is characterised by the original nature of the communications submitted to the Society; for I am sure I need scarcely remind you that the careful and correct record of a very short and simple piece of work the result of painstaking personal investigation is of far more value and far more scientific interest than the most elaborate paper compiled from the labours of others.—*British Journal of Dental Science.*

NOTE.—The Index and Title Page for 1894 will be published with our January issue.

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